General
Gaulon

ISIS

International Review devoted to the History of Science and Civilization
Quarterly Organ of the History of Science Society and of the International Committee of the History of Science

SUMMARY

of No. 40 (Vol. XIII, 1)

I. *Main Articles* (6).

D. W. SINGER *(London)*. — MICHAEL SCOT and alchemy . . . 5
EDWARD JENNER (1749-1823)— An unpublished letter of EDWARD JENNER (1809) 16
G. SARTON *(Cambridge, Mass.)*. — The discovery of the law of conservation of energy, with 10 p. facsimile 18
L. ROSENFELD *(Göttingen)*. — Edmund Hoppe (1854-1928) (portrait) 45
L. THORNDIKE *(New York)*. — Of the cylinder called the horologe of travelers 51
L. THORNDIKE *(New York)*. — Vatican Latin manuscripts in the history of science and medicine 53

II. *Notes and Correspondence* (3).

Answer 3. GIOVANNI DE' FONTANA (L. THORNDIKE) 103
Trois autographes inédits d'AUGUSTE COMTE (G. SARTON) (1 pl.) . 103
Back volumes of *Isis*. 105

III. *Reviews* (20).

C. IX (2). HUNAIN IBN IṢḤAQ. The book of the ten treatises on the eye ascribed to HUNAIN IBN IṢḤAQ. Text edited and translated by M. MEYERHOF. Cairo, Government Press, 1928 (G. S.) 106

C. XIII (2). Opera hactenus inedita ROGERI BACONI. Fasc. IX. Ed. A. G. LITTLE and E. WITHINGTON. Oxford, Clarendon Press, 1928 (L. THORNDIKE) 110

SEEMANN, H. J. Die Instrumente der Sternwarte zu Marâgha nach den Mitteilungen von Al 'Urḍî. Erlangen, 1928 (G. S.) 111

C. XVI (1). AGRICOLA, G. Zwölf Bücher vom Berg- und Hüttenwesen. Übers. von C. SCHIFFNER u. a. Berlin, Verein d. Ingenieure, 1928 (G. S.) 113

AGRICOLA, G. De re metallica. Transl. by H. C. HOOVER and L. H. HOOVER. London, 1912 (G. S.) 113

C. XVI (2). PARKS, G. B. Richard Hakluyt and the English voyages. Ed. by J. A. WILLIAMSON. Am. Geographical Soc., New York, 1928 (J. K. W.) 116

C. XVII (1). KEPLER, J. Neue Astronomie. Übers. v. M. CASPAR. München, R. Oldenbourg, 1929 (G. S.) 118

C. XVII (2). GUNTHER, R. T. Early Science in Oxford. IV. The Philosophical Society. Oxford, 1925 (G. S.) 118

C. XIX (1). CAJORI, F. The chequered career of F. R. HASSLER. Boston, Christopher Publ. House, 1929 (G. S.) 119

Antiquity. KUBITSCHEK, W. Grundriss der antiken Zeitrechnung. München, BECK, 1928 (H. G. BÉVENOT) 121

Greece. BAILEY, C. The Greek atomists and EPICURUS. Oxford, Clarendon Press, 1928 (G. S.) 123

Middle-Ages. RATHGEN, B. Das Geschütz im Mittelalter. Berlin, Verein d. Ingenieure, 1928 (G. S.) 125

Islam. FERRAND, G. Introduction à l'astronomie nautique arabe. Paris, GEUTHNER, 1928 (G. S.) 127

Mathematics. SANCHEZ PÉREZ, J. A. Las matemáticas en la Biblioteca del Escorial. Madrid, E. MAESTRE, 1929 (G. S.) 128

CAJORI, F. A history of mathematical notations. II. Chicago, Open Court, 1929 (G. S.) 129

Astronomy. SHAPLEY, H. and HOWARTH, H. E. A source book in astronomy. New York, McGRAW-HILL Co., 1929 (G. S.) 130

Physiology. DEJUST, L. H. et autres. Études sur la chimie physiologique de la peau. Paris, A. LEGRAND, 1928 (R. M. MAY) . . . 134

History of Civilization. ROBINSON, J. H. Civilization. London, Encycl. Brit., 1929 (G. S.) 136

History of Medicine. GARRISON, F. H. An introduction to the history of medicine. Philadelphia, W. B. Saunders, 1929 (G. S.) 137

Superstition. KITTREDGE, G. L. Witchcraft in Old and New England. Harvard Univ. Press, Cambridge, 1929 (L. THORNDIKE) . . . 138

IV. *Critical Bibliography.*

Twenty-sixth Critical Bibliography of the History and Philosophy of Science and of the History of the Civilization (to March 1, 1929). 718 items contributed by eleven scholars 142

V. *Plates and Facsimile.*

Facsimile No. 5. J. R. MAYER : Bemerkungen über die Kräfte der unbelebten Natur (1842) 35
Facsimile No. 6. J. P. JOULE : On the calorific effects of magneto-eletricity and the mechanical value of heat (1843) 43
Facsimile No. 7. SADI CARNOT. Ms. note in the archives of the Academy of sciences, Paris (c. 1824-32) 44
Pl. 1. E. Hoppe (1854-1928) 45
Pl. 2. Trois autographes inédits d'AUGUSTE COMTE 103

Michael Scot and Alchemy.

Professor HASKINS has drawn attention in *Isis* (1) to an alchemical treatise attributed to MICHAEL SCOT. It gives an interesting picture of the co-operation of Latins, Hebrews and Saracens in the practice of alchemy. Professor HASKINS cites XIV and XV century copies of this treatise. There is, however, a XIII century version (2) at Caius College, Cambridge. This, though shewing considerable divergences from the Palermo and Oxford versions used by Prof. HASKINS, takes back the attribution of alchemy to MICHAEL SCOT to something like a contemporary date. Like the later manuscripts, however, the Caius version suggests a compilation from various writers, including MICHAEL SCOT himself. Yet another excerpt of the XV century suggests one GULIELMUS PARISIENSIS as the compiler. (3)

Could the Caius text be a rescension of JACOBUS JUDEUS

---

(1) « The Alchemy ascribed to MICHAEL SCOT » in *Isis* N° 34, Vol. X (2) pp. 350-359, June 1928. The texts used by Professor HASKINS are from Palermo, Biblioteca comunale Qq A10 and Oxford, Corpus Christi College 125.

(2) Cambridge, Gonville and Caius College Ms. 181 pp. 19-32. In the following notes, page and line numbers of the Caius Ms. are in square brackets. The chapter numbers in round brackets are those used by Professor HASKINS. The page and line numbers in round brackets also refer to Professor HASKINS' article in *Isis* (*cf.* note 1) and are prefaced by the letter I.

(3) Oxford, Bodleian Library, Ashmole 1450 pp. 14-18. Cf. D. WALEY SINGER « *Catalogue of Latin and Vernacular Alchemical Mss. in Great Britain and Ireland dating from before the XV° century* », 1 pp. 133-4, Brussels 1928. N° 153 (iii) in that catalogue, attributed to GULIELMUS PARISIENSIS, contains Chapter (I) only of the MICHAEL SCOT text. This does not mention MICHAEL, and all references to the different peoples (*Latini*, *Ebrei* and *Saraceni*) have been suppressed. It was perhaps to a GULIELMUS PARISIENSIS that ROGER BACON addressed his *Epistola de secretis naturae et artis et de nullitate magiae*. Dr. A. G. LITTLE (*Roger Bacon Commemorative Essays* p. 395, Oxford 1914) suggests WILLIAM OF AUVERGNE (died 1248) as an identification of this GULIELMUS PARISENSIS. Although, however the Epistola has come down to us from the XIII century and is regarded as genuine, there appears to be no Ms. authority for the name of GULIELMUS PARISIENSIS as the recipient of ROGER's letters. This name is first attached to the *Epistola* in XVII century printed editions.

who is mentioned in the version of Professor HASKINS? In favour of its Jewish origin is the omission of the name of Christ from the pious invocations in Chapter (II). It will be noticed that the Caius text contains in Chapter (II) the phrase opening *Ego magister Michaelus Scoticus* and in the Treatise on Salts and Alums the phrase *Magister Michael scotticus dixit*, while Chapter (V) is in this MS. described as *secundum magister M. Scotum*. The use of the word *glassa* (4) rather suggests a northern relationship. But whoever the compiler of this XIII century text, it presents a clear picture of the cultural cooperation of Latins, Hebrews and Saracens. Moreover, it takes back to the XIII century the attribution of alchemy to MICHAEL SCOT.

Title and Chapter (I). The Caius copy of the treatise is entitled merely *Tractatus Alkimie* nor has Chapter (I) [p. 19 lines 1-17] any sub-title. Otherwise Chapter (I) has only verbal differences from the texts used by Professor HASKINS but it ends (*cf.* I, p. 351 last two lines to p. 352 line 2) : *undique et intramarinis partibus cum uiris sophisticis et sapientibus latinis ebreis et arabis et undique partibus prouincis linguam hominum perquisitis eorum philosophiam animo meo retenui et notaui.*

Chapter (II) [p. 19 line 17 to p. 20 line 17] is without title and has considerable verbal differences from the text of Prof. HASKINS. It has a version of the passage crucial for MICHAEL SCOT'S authorship (I. p. 352 line 24) : [p. 20 line 2] *Ego magister Michael scoticus interpretacionem agredior secundo* [The sign is ii] *magistro Theophilo gatero saracenorum registre* [*regis terre*] *Tunye uel Rumye huiusmodi minisculum mitto. Secreta nature et verba philosophica que audiui totam volo translatare alkamiam. Hic est solutio caliditatis*. . . . . The chapter continues as in the texts of Prof. HASKINS but omits the reference to PTOLEMY (I, p. 352 last line) citing only *philosophus Hermes*. The next phrase, *Te quoque, quicumque es*. . . does not suggest that the tract was originally sent to THEOPHILUS. The phrase perhaps introduces an editorial interpolation.

The remainder of Chapter (II) has only verbal differences from Professor HASKINS' text. The pious invocations are in the same form, but *Jhesus Christus* is not mentioned.

The brief *Chapter (III)* [p. 20 lines 17-20] is without title but otherwise as in the text of Prof. HASKINS, though the Caius scribe

(1) Caius text, p. 29 line 13. Cf. Appendix.

has accidentally omitted *Capricornus* from his *signa planetarum xii.*

Chapter (IV) [p. 20 lines 20-27], which has also no title, expatiates rather further than the later texts on the elemental qualities of the metals and on their astrological affinities.

After a version of the opening words of the Introduction to Chapter (V), the work continues [p. 20 line 27 to p. 24 line 24] with a *Treatise on salts and alums* which is not in the first treatise of Prof. HASKINS' text, but perhaps corresponds to some of the later parts of the Palermo text, not printed in full by him. This treatise of the Caius text is easily recognisable by a sort of chorus that recurs concerning each substance : *constringit mercurium et dealbat..* [or other virtue but always beginning *constringit mercurium*] . . . *si vis ipsum cognoscere. . .*

It contains a passage opening [p. 22 bottom line] *Magister* [p. 23] *Michael scotticus dixit quod sal nitrum nobile est inter omnia alia et melius*; *Hermes etiam multum commendabat ipsum et dixit quod mercurium subtiliter constringit et facit malleabilem et dealbat es et mutat in meliorem lunam quam sal alkali et de venere facit optimum solem. Dico optimum quod eo melius non potest inueniri. Si vis ipsum cognoscere tale sal est longum parum et ininicum* (sic) *et album satis. . .*

Among the places cited in this treatise on salts and alums are: « *in inda, quadam provincia? maris versus marioch* (p. 21 lines 13-14) « *in partibus ungarie juxta scergonem* (?) *et in alia parte . . . in barbaria* » (p. 21 lines 32-33); « *apothecarii de monte persolano* (sic.) » (p. 21 lines 33-34); « *in partibus sardinie, in quodam monte quo multi sunt heremite et in partibus alapie* » (p. 22 lines 16-17); « *in alexandria et in alap et in armenia saracene* » (p. 22 lines 25-6); « *iuxta castrum babilonie, saraceni aportant ipsum in alexandriam et in acaton* » (p. 23, lines 8-9); « *hispania . . versus argoniam in quodam monte juxta mare* » (p. 23, line 11); « *in partibus alapie et in barbaria et in contaronte apotecharii de monte pessulano* » (see above) (p. 23, lines 22-23); « *dicitur indicum, quia in india inuenitur* » (p. 23 line 24); « *apud maroc, in partibus alexandrie* » (p. 24, line 1).

The Caius text then reverts to *Chapter (V)* [p. 24 line 24 to p. 25 line 16]. This is entitled *Distinccio de maiori magisterio secundum magistrum M. scotum qualiter venus in solem permutatur.* The reference to Frater HELYA is omitted, as is also the reference *alio libro a nobis translato*, and the chapter opens *Accipe sanguinem*

hominis ruffi, (I p. 353, 3 lines from bottom). To the end of Chapter V the text remains to some extent parallel with those of Professor HASKINS, though by no means identical.

The Caius College manuscript next gives versions of Chapters (VI) to (XIII) corresponding fairly closely with the texts of the later manuscripts, but omitting all mention of personal names.

Thus the brief *Chapter (VI)* [p. 25 lines 16-19] (5) has no title. It follows that printed by Prof. HASKINS only as far as « *de alumine rubeo* », thus giving no reference to MICHAEL SCOT or to Frater Helias.

Chapter (VII) [p. 25 line 19, p. 26 line 3] (6) *Distinccio de maiori magisterio qualiter mercurius possit constringi mortificari et mutari in lunam bonam.*

Accipe sanguinem hominis ruffi comburentem, ouum metallorum, sanguinem bubonis, colofoniam, tartarum album . . . supra proice boracem. Borax faciet ipsos album et dulcem, et luna ista erit valde bona.

Here again is omitted the colophon, which in the Corpus manuscript gives the names of MICHAEL and ELIAS and in the Palermo manuscript mentions MICHAEL SCOT only.

Chapter (VIII) [p. 26 lines 3-16] (7) *Dealbacio eris perfecta.*

Accipe marcha marchasitam argenteam calcam (sic) *tutiam affricanam . . . alumen de alap quod est rubeum . . . cum fusum fuerit proicies sales suos dessuper et habebis optimam lunam.*

Chapter (IX) has in the Caius text a different title from that printed by Professor HASKINS and again the Caius text gives no names. There are interesting verbal differences between it and the Corpus text, and the Caius text is somewhat briefer.

Chapter (IX) [p. 26 lines 16-24] (8) *Constriccio Mercurii.*

Accipe succum portulace marine et succum iusquiani . . .

. . . . iste puluis constringit mercurium cum suis salibus et mutat in lunam, et hoc facit cum alumine rubeo et tutia que inuenitur in alumine de alap et cum quodam dumo quod inuenitur in partibus barbarie. (9)

---

(5) Cf. Corpus text, F. 98 lines 16-22.

(6) Cf. Corpus text, F. 98 line 22 to F. 98v line 4.

(7) Cf. Corpus text, F. 98v lines 5-24.

(8) Cf. Corpus text, F. 98v line 25— F. 99 line 7.

(9) The Corpus text has : *et cum quadam gumma que in partibus kalabrie inuenitur et in monte pessulano.*

Chapter (X) in the Caius text is again much as in the two later manuscripts, but it lacks the introductory phrase with the ascription of authorship and it also lacks the colophon mentioning Frater HELIAS.

Chapter (X) [p. 26 line 25, p. 27 line 7] (10) *Dealbacio eris.*

Accipe comburentem sanguinem bubonis . . . (proceeding much as previous chapter)

. . . donec consumatur usque ad tertiam partem et postea distilletur

Chapter (XI) also gives in the Caius version no names of persons, and lacks both the Introduction and the colophon of the later texts. It is somewhat shorter than in the Corpus text.

Chapter (XI) [p. 27 lines 7-25] (11) *Pro ioue dealbando*

Accipe succum iusquiani, succum sorbarum, succum malorum granatorum [*cf.* I. p. 355 lines 10-11] . . . . .

. . . . iiii dragm. de pulvere isto faciunt iouem sustinere quodcumque iudicium. Iste puluis laborat in sole et constringit mercurium et dealbat es. [*cf.* I. p. 355 lines 12-13.]

Chapter (XII) is again somewhat shorter in the Caius version and lacks both the introduction and the colophon of the later copies, with their personal names.

Chapter (XII) [p. 27 line 25-28 line 7.] (12) *Accipe plumbum et funde cum comburente et cum arsenico rubeo et vitriolo sublimato . . .*

. . . deinde funde plumbum cum puluere isto, addendo alumen rubeum, et habebis optimum solem, et hoc est certum valde.

Chapter (XIII) has an introductory phrase not in the two later copies.

Chapter (XIII) [p. 28 line 7] (13) *Restat iam dicere de gummis.*

Multa sunt genera gummarum sed que valent in arte sunt iste: gumma salanonicum, gumma armenicum quod est quasi rubeum, gumma que inuenitur in alumine de pluma et est rubeum, gummum quod vocatur gumma quod inuenitur in alumine rubeo et est valde preciosum.

From this point, the Caius text diverges from those used by Professor HASKINS. [p. 28 lines 11-13] *Quatuor ut dictum est sunt*

---

(10) Cf. Corpus text, F. 99 line 8 — F. 99 v line 3.

(11) Corpus F. 99v line 4 — F. 100 line 11.

(12) Corpus F. 100 lines 11-36.

(13) Corpus F. 100 lines 37-40. F. 100v gives Chapter (XV) which is no in the Caius version.

species, comburens, arsenicum, mercurius, sal armoniacum. Septem sunt corpora, saturnus iupiter mars sol venus mercurius luna.

The next few lines give a longer version of a passage which Professor HASKINS found in the Palermo volume as *Chapter II* of a second alchemical treatise attributed to Michael Scot (Cf. I p. 356).

[p. 28, lines 14-22] *Tere vitreum et ablue cum aceto sorborum* [sic] *et malorum granatorum* 8 *vicibus, et sicca. Deinde funde in crucibulo ferreo et deinde extingue in aqua salis communis et salis armoniaci septies, et erit coloratum colore solis. Tere iterum et ablue cum aceto mali siluestris . . . .*

. . . deinde funde XX vicibus in crucibulo ferreo et totidem vicibus extingue in aqua salis communis et salis alkali et erit coloratum colore lune.

[p. 28 lines 22-30] *Inde coxeris arsenicum in oleo amigdalarum amaris* [sic] . . .

. . . deinde facias sal separari cum aceto. Hoc facto, arsenicum sic preparatum administretur secundum quod determinatum est. Per hoc complebitur eius fixio.

[p. 28 lines 30-33] *Aceta que operantur in arte sunt hec. Acetum ceparum sequillarum, acetum malorum granatorum acetosorum, acetum sereininum album cum est album, acetum sorbarum, acetum cuiuslibet salis acetosi.*

[p. 28 line 33, p. 29 line 1]. *Nota quod gummum quod nuenituri de alumine de pluma et quod inuenitur in alumine romano et in alumine rubeo preciosa* [p. 29] *sunt valde, et cum ipsis potest fieri perfectus sol sine salibus et perfecta luna.*

[p. 29 lines 2-3] *Nota quod in pluribus debet poni plus de marchasita quam de aliis, de comburente et sanguine bubonis minus quam de aliis.*

[p. 29 lines 3-5] *Iouem sic purga.*

Accipe calcis uiue . . .

. . . extingue septies iouem, postea fusum proice in cineres pluries.

[p. 29 lines 6-10] *Ad multiplicationem auri.*

Accipe es combustum . . .

. . . habebis quod petis.

[p. 29 lines 10-12] Aliud. *Accipe duas partes. . .*

. . . funde insimul et habebis quod petis.

The Caius text now diverges from alchemy proper to what we may rather call *chemical craftsmanship*, in which, as is common in

texts of this nature, is included *natural magic*. This final section of the Caius text, we print in an Appendix.

Besides the prose alchemy, we have other evidence of the reputation of MICHAEL SCOT for alchemical activities. This is contained in a curious poem. The two copies known to me, one at Oxford and one at Cambridge, are almost identical. (14) They are of the XV century and are headed by a phrase that occurs in late XV and XVI century alchemy. (15) This is :

Bufo gradiens per terram et aquila volans per aerem est magisterium.

After this motto occurs the following title :

Documentum cuiusdam spiritus traditum magistro scoto de virtute Bufonis seu philosophici lapidis siue avis phoenicis.

There follows a prose prologue giving directions for alchemical processes under the symbolism of the toad.

Then follow the two sections of the poem [containing respectively 59 and 36 lines]. The first section, after reciting the medical virtues of the alchemical elixir, expresses pious gratitude for the help of Christ.

The second section « *ad lectorem* », after emphasizing the mystic joys of alchemy, enters into a paean of praise of *Sol*, (i. e. Gold), *Diana* (apparently Silver) with *Mercury* as their attendant. Both sections close with the word *Telos*.

The Oxford manuscript is contained in a XV century volume with a number of other interesting alchemical texts. The Cambridge copy is of the late XV or XVI century. It is written by AEGIDIUS DE VADIS or DU WES, tutor to the English TUDOR Princesses. DU WES was a great collector of alchemical treatises, many of which he copied in his own hand. His copy of the MICHAEL SCOT poem is abundantly glossed. Space for illustration has been left after each section of the poem. That after Section I has remained vacant. The end of the poem shews a drawing of three figures whom we recognise by the astrological symbols placed by their heads as Sun and Moon, being joined in matrimony by Mercury, a common alchemical allegorical device.

The next text in the volume is an alchemical commentary apparently by DU WES himself, on the poem DE PHENICE of

---

(14) Oxford, Bodleian Library, E. Mus. 63 ff. 77-78v and Cambridge Trinity College 1399 ff. 1v-4 *cf.* D. WALEY SINGER *loc. cit.* Vol. II, number 800.

(15) *Cf.* D. WALEY SINGER *loc. cit.* Vol. II, numbers 448 and 568.

LACTANTIUS, and is also adorned by a figure showing the phoenix arising from flames and illumined by the sun. (16) The qualities ascribed to the phoenix are of course easily susceptible of alchemical interpretation. (17) The symbolism of the toad, however, which provides the motive of the MICHAEL SCOT poem, I have encountered only in comparatively late alchemy, of the XV or XVI century. It is entirely in harmony with the legend that grew around the name of MICHAEL SCOT, that alchemical secrets should have been revealed to him by an evil spirit « *Documentum cuiusdam spiritus.* » But it will be noted that we have encounterd no copy of this poem earlier than the XV century.

It is thus the Caius College Ms. which provides our only glimpse of the belief of his contempararies in the alchemical skill of MICHAEL SCOT.

(London) DOROTHEA WALEY SINGER.

APPENDIX

Cambridge, Conville and Caius College Ms. 181 pp. 29-32.

[p. 29 line 12 — p. 30 line 6] Ignem grecum hoc modo conficies. Accipe glassam et sallim (?) et apopanase quali pondere, que puluerisa in mortario eneo subtilissime. Post funde in poto bene cocto habente longum et strictum orificium lento igne quibus fusis et liquefactis, inpone sulphur viuum et cacabre et piculam (?) naualem. Accipe fimum columbinum bene puluerizatum, in duplo respectu primi puluerisi et incorpora simul cum spatula; quibus simul bene incorporatis et liquefactis, infunde oleum laterinum et terebentinam distillatam et alkibrit (?) et oleum sulphurinum bene callidum equali mensura, et moue bene cum spatula incorporando ut fiat ad modum vernice. Postea infusum pone in ampullam vitream orificio bene clauso, et predictam ampullam in fumo equino repone calido per dies vii vel xvi, ut simul dissoluantur et fiat ad modum unguenti liquidum fumum de vii in septimum diem renouando post in mediate a fumo extractum in cucurbita repone vitrea aut vitreata, alembico subposito iuncturis undique luto tenacissimo

(16) The title LACTANTIUS *de phenice* has been accidentally written by DU WES before the second section of the MICHAEL SCOT poem, as well as in its proper place.

(17) The collocation of the phœnix with alchemy occurs in ROGER BACON's *Epistola de secretis nature et artis et de nullitate magiae.*

bene clausis, distilla oleum a pulueribus velud aquam rosaceam igne lento de carbonibus per vasum distillando. Cum uero hoc igne ut volueris habeas sagittam quam dictam in quatuor partibus foraminibus perforatam atque interius concauam. Et inpone tentas factas de papiro intinctas in oleo et accensas, quas protinus arcu pone uel balista. Aut si uolueris stupas in oleo tinctas et in ampullam repone vitreis [*sic*], et accensas mox deice aut lapides grossos (?) circuminvolutos bombace aut fustagine (?) et ipsos oleo iniunctos iam dictos et accensos cum machinis aut aliis instrumentis iacta ad loca ostilia. Modo videndum quod predictus ignis grecus extingui poterit aceto fortissimo et urina antiqua uel arena, uel fiatur spisso tribus vicibus aceto atro inbutus, ignem predictum suffocando. Si uero aqua superiactata fuerit protinus aumentabitur ipsius incendium atque flamma.

[p. 30 lines 7-19] Oleum siue aqua ardens intrehentiua (?) hoc modo extrahitur.

Repone ipsam terehentiuam in curbita forti interius bene vitreata et dissolue ad ignem lentum calefaciendo ut fiat liquida sicut aqua. Tunc infunde ad pondus ipsius de oleo lini et simul bene incorpora et continue cum spatula mouendo. Post alembico superposito et peroptime barinatercio et albumini ouorum conglutinata de sutilli igne lento carbonum eius oleum, ad modum aque, purissimum clarum de quo si cultellum intinxeris et illi candelam ardentem aplicaueris, mox flammam maximam prouocabit. Aut si in ampulla supra vinum surdens proic[i]t, iam dictum est accensum in tabula, flammam maximam prouocabit. Aut si volueris in testa aliqua querina (?) sulphur viuum et super ipsum cum flamma iacta oleum predictum et omittet flammam maximam et valde subtilem.

[p. 30 lines 19-26] Oleum de sulphure hoc modo fit.

Dequoque oua prout petrina ut dura efficiantur. Post vitella eorum accipe et in mortario contere subtilissime ut velut butirum efficiatur vel unguentum. Tunc accipe sulphur viuum subtilissime tritum ac cribellatum et cum predictis vitellis peroptime incorpora malliando. Postea in cucurbita repone vitrea bene clausa et distilla per alembicum oleum sulphureum ab omnibus philosophis occultatum.

[p. 30 lines 26-31] Additur modus alius ad extinguendum oleum a sulphure.

Accipe oleum iuniperinum et ipsi incorpora sulphur viuum subtilissime cribellatum ut fiat ad modum unguenti quod in cucurbita vitrea reponitum peroptime clausa, destilla eius olium prout de vitellis iam dictum est.

[p. 30 lines 31-33] Et nota quod predicti olei distillacio sub tecto fieri prohibitur propter eius fetorem. Ac incendia, quoniam si altiora ascenderet, periculum iniueret.

[p. 30 line 33 — p. 31 line 5] Nucem muscatam aut anulum aut

pomum siue sigillum aureum hoc modo conficies, uel nummum. Accipe gummi amigdalarum et ipsum dissolue in glarea ouorum, de quo illinies quamcumque rem deaurandam. Postea auri superpone petalam, id est aurum tenue foliatum, post suauiter cum bombace conprime et desiccari permitte atque indurari quam predictum est.

[p. 31 lines 5-14] Aqua acuta mirabilis subito dealbens omne metallum in colorem lune.

Accipe sal armoniacum, alumen de plumo siue tartarum vini albi, sal commune, omnia equali pondere absque tartaro de quo pones amplius : predicta omnia bene puluerizata pone in crucibulo cum metallo dealbando, et fac bulire cum aceto fortissimo per horam, modicam mouendo cum baculo ferreo. Postea metallum sic bullitum in aqua laua frigida et absterge cum panno lineo et erit lactei coloris. Sed oportet quod predictum metallum sit purgatum et haberit medietatem sui de argento bono.

[p. 31 lines 14-20] Scripturam auream hoc modo facies.

Accipe de cupro rubeo uel ere croceo et frica in cotecum fortissimo aceto et sale mediantibus, donec sufficiat eius quantitas. Postea purga ipsum puluerem a sordibus cum aqua clara, lauando sepius et desiccando : cum uero de ipso scribere volueris, distempera cum aqua gummata, postea litteram siccatam poli cum dente canis ut splendefiat.

[p. 31 lines 20-24] De hoc ut candelam a sole accendere possis. Accipe bacinum bene pollitum et pone in medio ipsius speculum bene clarum et in circuitu speculi stupam subtiliter carpinatam uel pannum lineum combustum quod melius est, et pone in terra die solari et statim accendetur.

[p. 31 lines 24-28]. Ad idem modus alius.

Accipe berillum ad modum oui rotundum et ipsum tene contra radios solis et apparebit in ipso solis occlusus contra quem pannum lineum combustum si tenueris protinus accendetur ignis.

[p. 31 lines 28-35] Ymago que emittit ab arbore flammam ardentem continue.

In tabula fac ymaginem hominis uel alterius animalis de cupro interius siue de stangno concauam et stricti aliquantulum orificii, et ipsam impleas sulphure viuo subtiliter puluerizat[o]. Distempera cum aqua terebinte distillata aut aqua ardente qua ymagine ad ignem calefacta emittet ab ore flammam oribilem. Vator [*sic*] in candelam semel accensam applica et ardebit.

[p. 32 lines 1-5] Qualiter azurum fiat artificialiter.

Accipe croceam pellicariam bene mundam aut gippsum combustum, album hispanicum quod melius est, et ipsum tere subtilissime in lapide marmoreo semper inbibendo cum flore col[er]ato qui reperitur in doliis tinctorum in persico, et desiccari permitte quod semel aut bis faciendum est et habebis colorem azuri.

[p. 32 lines 6-12] Ad idem alius modus.

Accipe laminas boni argenti tenues et ipsas suspende in poto aliquo aceti acri callidi semipleno, orificio bene clauso; post in fimo equino bene calido per dies XV ponere : fimum de vii. in septimum diem renouando. Postea laminis extractis recipias ipsas flores circumdatas, quas apprehende et desicca et iterum pone ut prius quousque tibi calor sufficiat.

[p. 32 lines 13-20] Notandum quod duplex est azurum et sic duplex est eius affinicio. Est enim lombardicum et transmarinum. Lombardicum affinatur per capuellum [i.e. cupellation] hoc modo. Accipe lixiuum bonum factum de cineribus clauellatis in quo dissoluas saponem romanum siue gallicum et in ipso fac bulire unciam azarii subtilissime tritam qua despumat, effunde lixiuum et florem azurii qui in fundo patelle remanserit, laua pluries in aqua limpida, et aqua effusa, collige azurum et ipsum desicca et in coreo reserua.

[p. 32 lines 21-32] Azurum transmarinum hoc modo per pastillum afinatur.

Accipe masticem calaphonum (?) resinam cepum arietinum terram albam virgineam, que dissolue in oleo lini calido uel terebintino, quibus omnibus insimul bene incorporatis, funde in aquam frigidam. Postea pastillo indurato collige ipsum, reserua, donec corpus fuerit. Cum autem ipso uti volueris ipsum molifica aqua tepida, post incorpora ipsum azurio transmarino subtiliter trito, quod extrahe mediante aqua calida, mouendo pastillum cum baculo, post quam coloris etherei cola per pannum lineum et aqua depurata ipsum effunde et puluerem in funde patelle plumbee remanentem collige et reserua.

[p. 32 lines 32-33] Fermentum siue electuarium ad lunam seu ad solem hoc modo conficitur.

Accipe libram argenti viui et libram unam aluminis glasse et libram unam coporose.

An unpublished letter of Edward Jenner (1809).

Dear Sir,

Mr. I. GREEN, the Gentleman who will present this letter to you, is a young man of amiable character. He is the son of a worthy clergyman in my neighbourhood, for whom I have a great regard. Having solicited an introduction from me to a Friend of mine in Calcutta, to no one could I recommend him in India who has a greater claim to that title than yourself, as you have shewn a friendship to me which has produced substantial benefits, and which be assured my Dear Sir, I shall ever most gratefully remember. I trust you will pardon the liberty I take on this occasion.

Bombay has been good enough to follow the example of my Benefactors in Calcutta, and Madras is about to do the same; at least I hear so, and indeed have seen a List containing some respectable names which open the Contribution. So that the Seed which you so kindly planted, has ramified luxuriantly, and produced abundantly.

Our Friend Dr. SAUNDERS told me we might ere long expect the pleasure of seeing you in England, a pleasure I should much enjoy. I live as much in retirement in my native Village, Berkeley in Glostershire, as Circumstances will permit. When you return, I should be most happy with a visit from you. Here you may shut out as much of the artificial World as you please, and enjoy it more in the State in which Nature fashioned it.

It will be no news to you to hear that Vaccination goes on most charmingly all the World over. The information I derive from all Quarters allows me to say that wherever it is universally adopted, the smallpox ceases to exist.

With best wishes for your health and happiness, believe me, my dear Sir,

ever, most truly
Yours
EDW. JENNER

Berkeley
Feb. 21 1809.

This letter belongs to Mr. EDWARD MAYO TOLMAN of South Hingham, Massachusetts, who kindly allowed me to take a copy of it for publication in *Isis*. The name of the addressee is unknown but one of our Calcutta correspondents may be able to discover if. G. S.

The Discovery of the Law of Conservation of Energy.

With Facsimile Reproductions (nos. V and VI) of MAYER's and JOULE's earliest printed contributions, and of a manuscript note by SADI CARNOT (no. VII).

Contents: 1. Introductory; 2. ROBERT MAYER; 3. JAMES PRESCOTT JOULE; 4. MAYER and JOULE; 5. CARNOT, SÉGUIN, and COLDING; 6. Additional bibliography; 7. English translation of MAYERS's first printed paper (1842); 8. Transcription of the page of SADI CARNOT's manuscripts reproduced in facsimile no. VII.

Facsimile no. V. J. R. MAYER: Bemerkungen über die Kräfte der unbelebten Natur (*Annalen der Chemie und Pharmacie*, vol. 42, 233-40, Heidelberg, 1842).

Facsimile no. VI. J. P. JOULE: On the calorific effects of magneto-electricity and the mechanical value of heat (*Report of the thirteenth meeting of the British Association*, Cork, August 1843; *Transactions* of the sections, p. 33, London 1844.

Facsimile no. VII. SADI CARNOT: Manuscript note in the archives of the Academy of Sciences, Paris. Date c. 1824-32.

1. — *Introductory.*

The greatest bane of our studies is their secondhandedness. Among the scientists, historians, and philosophers, who take an interest in them, only a few make genuine attempts to return to the sources; and of these few, only a very few are able to reach those sources. Indeed many of the earlier scientific writings are available only in the largest libraries. We hope to change these conditions by printing in *Isis* not only the text of some of the scientific classics, but the ipsissima verba of the originals. That is, we shall publish exact photographic equivalents of them. To be sure, this can be done only for a small number of the shorter works, but from the methodological point of view this does not

matter so much because our chief purpose is to train our readers to want the originals. Having acquired the habit of referring to the very sources, and of basing their judgment upon their own autopsies, they will surely find ways of obtaining any other original which they may need in the course of their investigations.

These facsimile publications will be especially useful to scholars teaching the history of science, as well for their own use as for the use of their classes.

The following (unnumbered) facsimiles have already appeared in *Isis*.

I. ABRAHAM DE MOIVRE : Approximatio ad summam terminorum binomii $(a + b)^n$ in seriem expansi (Nov. 12, 1733; published in London, 1738). Edited by R. C. ARCHIBALD. *Isis*, 8, 671-83, 1926.

II. BLAISE PASCAL : Essay pour les coniques. (Paris 1640). With an English translation by FRANCES MARGUERITE CLARKE and a preface by DAVID EUGENE SMITH. *Isis*, 10, 16-20, 2 pl., 1928.

III. H. C. OERSTED : Experimenta circa effectum conflictus electrici in acum magneticam. (Copenhagen, 1820). With preface by G. SARTON, and portrait. *Isis*, 10, 435-40, 1928.

IV. H. C. OERSTED : Experiments on the effect of a current of electricity on the magnetic needle. (London, 1820). Original English translation of III. *Isis*, 10, 441-44, 1928.

2. — *Robert Mayer* (1814-78).

The discovery of the existence of an invariable relation between heat and work was made independently at almost the same time by two men who were utterly unlike and whose processes of thought were as different as their own personalities. JULIUS ROBERT MAYER was a German physician with but little physical and mathematical knowledge. In the course of his service as a doctor aboard a Dutch ship he discovered the law of conservation of energy, by a sudden intuition. This great discovery, comparable in its suddenness to a religious conversion, occurred while he was in the harbor of Surabaya (N. E. Java) in July 1840. His whole life was henceforth devoted to the development and defense of that idea; after a few years of happy work, the effort which he

had to make to continue his activity in the face of untoward circumstances was so great that his health, physical and mental, was undermined and wrecked. The largest part of his life was spent in his native city, Heilbronn, where he died in 1878.

He wrote his first paper on the subject, entitled « *Ueber quantitative und qualitative Bestimmung der Kräfte* », on June 16, 1841, and sent it to POGGENDORFF, who rejected it. This was very fortunate, for that paper contained gross errors. The first paper to be published was written half a year later in the beginning of 1842 and submitted to LIEBIG who accepted it for the *Annalen der Chemie und Pharmacie* of which he was the editor together with FRIEDRICH WÖHLER. That paper, entitled *Bemerkungen über die Kräfte der unbelebten Natur*, was published in vol. 42, 233-40, Heidelberg, 1842. This was the first paper containing a clear statement of the law of conservation of energy, and an attempt to determine the mechanical equivalent of heat. Our Facsimile Reprint No. V is a photograph of it. We also reprint the English translation by G. C. FOSTER, published in the *Philosophical Magazine* (vol. 24, 371-77, 1862) at the request of TYNDALL and JOULE.

MAYER published elaborations of his views in many other papers of which the most important are : (1) *Die organische Bewegung in ihrem Zusammenhange mit dem Stoffwechsel* (Heilbronn, 1845); (2) *Beiträge zur Dynamik des Himmels* (Heilbronn, 1848); (3) *Bemerkungen über das mechanische Aequivalent der Wärme* (Heilbronn, 1851). It should be noted that these three important essays were printed, not in scientific journals, but independently at the author's own risks. However, the latter had obtained sufficient recognition before his death to warrant the publication of two editions of his collected writings (Stuttgart, 1867; Stuttgart, 1874). A third edition was admirably prepared by a fervent disciple, JACOB J. WEYRAUCH (2 vols., Stuttgart, 1893). The second volume includes minor writings, letters, and biographical documents; it also includes the text of the unpublished memoir of 1841.

A partial summary by JOHN TYNDALL of the memoir of 1845 will be found in the *Philosophical Magazine* (vol. 28, 25-42, 1864). The same journal contains English versions of the *Beiträge* of 1848, by H. DEBUS (vol. 25, 241-48, 387-409, 417-28, 1863), and of the *Bemerkungen* of 1851, by G. C. FOSTER (vol. 25, 493-522, 1863).

3. — *James Prescott Joule* (1818-89).

MAYER was neither a mathematician, nor an experimental physicist. His great discovery had been accomplished by purely abstract means; he had made no experiments himself, but had used with considerable ingenuity the experimental results of others. It is clear that the grand generalization which he had attained in a flash of genius, however suggestive, would have remained unconvincing if it had not been supported by new experimental data. We have witnessed recently a similar sequence of events with regard to the theory of relativity. As long as it remained a mathematical abstraction, it was considered with general indifference or scepticism, but as soon as the experimental confirmations were provided, the whole scientific world, with but few exceptions, hastened to accept it.

In the present case, MAYER's philosophical discovery was confirmed and completed by the experimental investigations made independently at about the same time by the English physicist JAMES PRESCOTT JOULE. As opposed to MAYER, who was primarily a philosopher, JOULE was a metrologist. His main interest lay in exact measurements, and his special genius showed itself at its best in the invention of methods enabling one to obtain more and more accuracy in quantitative experiments. He thus devised many different methods by means of which the mechanical equivalent of heat (or the thermal equivalent of work) could be determined with increasing precision. His first paper on the subject was read on August 21, 1843, at the thirteenth annual meeting of the British Association for the Advancement of Science, at Cork, in south Ireland. It is interesting to note that it was read in the chemical section; even so, MAYER's first paper was published in a chemical journal. We may thus say that the greatest generalization of nineteenth century physics was introduced to the scientific world through the chemical door!

JOULE's paper « *On the calorific effects of magneto-electricity, and on the mechanical value of heat* » was printed in the *Philosophical Magazine* (vol. 23, 263-76, 347-55, 435-43, 1843), but a summary of it appeared in the *Reports of the Cork meeting* (Transactions of the sections, p. 33). The full paper is too long to be reproduced, but we give a facsimile (Reprint no. VI) of the summary, prepared

presumably by the author. I must warn the reader that reference to the paper itself is necessary to have a correct idea of the enormous experimental labor which it represents. These memorable experiments were made at Broom Hill, near Manchester. The original memoir was reprinted in « *The Scientific Papers of* JAMES PRESCOTT JOULE » edited by the Physical Society of London, within the author's life time (vol. 1, 123-59, 1884; a second volume appeared in 1887).

4. — *Mayer and Joule.*

A few years elapsed before the importance of MAYER's and JOULE's ideas began to be realized. When the scientific world was finally aware of it, it accorded some recognition to the discoverers, yet a longer perspective was needed for a complete appreciation of their achievements. This is natural enough; the bigger a thing is, the further we must be to see the whole of it. JOULE was the happier; as early as 1850 he was admitted into the Royal Society and two years later one of the royal medals was awarded to him. (1) MAYER does not seem to have obtained any recognition before 1858, when the *chemist* CHRISTIAN FRIEDRICH SCHÖNBEIN caused him to be elected an honorary member of the Scientific Society of Basle. But by that time, MAYER had disappeared so completely from the world, that LIEBIG who was praising him in a lecture delivered in Munich in that very year, spoke of him as if he had died in the insane asylum where he had been confined. MAYER died only twenty years later, but his troubles were not over, for in proportion as the scientists became more convinced of the pregnancy of that great discovery, they were more inclined to discuss the relative merits of the two protagonists.

The main champions of MAYER were chemists like SCHÖNBEIN and LIEBIG, and the philosopher EUGEN DÜHRING, who called him the Galileo of the nineteenth century (2), but also the English physicist, JOHN TYNDALL. His adversaries were P. G. TAIT and WM. THOMSON (KELVIN), and also HELMHOLTZ. A long

(1) The other royal medal of that year (1852) was given to THOMAS HENRY HUXLEY.

(2) EUGEN DÜHRING : Kritische Geschichte der allgemeinen Prinzipien der Mechanik (Berlin, 1873); ROBERT MAYER, der Galilei des neunzehnten Jahrhunderts (Chemnitz, 1880).

controversy took place in the *Philosophical Magazine* (vols. 24 to 26, and 28, 1862-64). Having read a large part of it, with that impartiality which a greater distance makes relatively easy, I have come to the conclusion that TYNDALL had the better part. He showed more insight and more generosity. Read for example his open letter to JOULE (vol. 24, 173-75, 1862).

MAYER's adversaries were generally bent on discrediting him entirely, while his friends, and notably TYNDALL, were anxious to give JOULE his due. In the letter to JOULE, he concluded « I do not think the public estimate of your labours can be in the least affected by any recognition which may be accorded to MAYER. There is room for both on this grand platform. Certainly, had MAYER never written a syllable on the mechanical theory of heat, I should not deem your work a whit nobler than I now hold it to be. »

This must also be our conclusion. It cannot be denied that ROBERT MAYER was the first to explain the first principle of thermodynamics, which has remained until yesterday one of the most fundamental conceptions of science. Recent discoveries are now calling it in question because our ideas of energy and of mass have been deeply modified, but this simply means that the principle of conservation of energy will take (once more) a different shape; it is not likely that it will be entirely discarded. If MAYER was the first to formulate it with some clearness, and to calculate the constant implied, nevertheless his discovery was essentially incomplete for it lacked experimental support. That support was given, in an admirable manner, with precision and abundance, by JAMES PRESCOTT JOULE.

These two names, MAYER and JOULE, must remain united in our grateful hearts. It is not possible to compare quantitatively two men who where so essentially different. MAYER's views were vague but broad, and he was the first. JOULE reached the same general conclusion a little later, but after having followed an entirely different path. We might compare them to two travelers who, coming from opposite directions, reached at about the same time the summit of the same mountain. The one thing that might be said to JOULE's advantage is this : MAYER's work was in itself insufficient, it could not stand without the experimental confirmation which JOULE provided; on the contrary,

JOULE's achievement was independent of MAYER's and needed no external support. JOULE built his theory upon a firm foundation, while MAYER built his upon sand; yet the fact remains that MAYER had seen the main truth and its implications before JOULE and more completely than he.

5. — *Carnot, Séguin, and Colding.*

The priority discussion between the defenders of MAYER and those of JOULE introduced other claimants. We may leave out of the question RUMFORD and DAVY whose works prepared the discovery but cannot be considered as an anticipation of it. Of course in the field of science, every step is preceded and conditioned by an infinity of others, yet when we speak of a definite discovery, we cannot give the credit of it to those who prepared it but only to those who made it.

We may leave out also the work of CARNOT and the discovery of the second law of thermodynamics (1824), which was much anterior to that of the first law but did not influence it. MAYER refused until the end to take any interest in it; JOULE devoted his energy to the full establishment of the first law. The synthesis of both laws and the systematization of thermodynamics was accomplished by other men, chiefly HERMANN HELMHOLTZ, WILLIAM THOMSON (KELVIN) and RUDOLF CLAUSIUS.

However, SADI CARNOT (1796-1832) was not simply the discoverer of the second law; he had also anticipated with astounding directness and lucidity the discovery of the first law. And not only that but one can deduct from his notebooks a definite value for the mechanical equivalent of heat, 370 kilogrammeters corresponding to one calorie. As compared with the modern value 426.5 this was a little better than MAYER's original value, 365. It is probable that but for his untimely death at the age of thirty-six CARNOT would have published this second immense discovery of his; at any rate it remained buried in his manuscripts and unknown to the world until 1878. If the fates had been kinder to him, he would have fully deserved to be called the discoverer of both principles, the father of thermodynamics. In a sense these titles may still be given to him, but with a restriction, — for it is a wise historical rule to give full credit only for published discoveries. One might claim that

his discovery of the second law was in itself sufficient to oblige us to hail him as the father of thermodynamics, and it is sure that, all considered, none of the early protagonists deserved that honor more fully than he did.

To return to published documents, something must be said of two other men, the Frenchman MARC SÉGUIN and the Dane LUDVIG AUGUST COLDING. SÉGUIN, who called himself Séguin ainé, was a nephew of the brothers MONTGOLFIER (3); he was born at Annonay (Vivarais, Ardêche) in 1786, and died there in 1875. He was a typical engineer, and his main work *De l'influence des chemins de fer et de l'art de les tracer et de les construire* (XIX + 501 p., 6 pl., Paris, 1839), bore the significant epigraph « L'industrie est devenue la vie des peuples. » It is in that work that one may find (p. 382, 383, 389, 403) an anticipation of MAYER's intuition, the proportionality of heat and work, but it contains no attempt to determine the coefficient of proportionality. (This was misunderstood by JOULE and TAIT; see TYNDALL in *Philos. Mag.*, vol. 28, 29-31, 1864, with English translation of pertinent passages).

LUDVIG AUGUST COLDING (1815-88) presented in 1843 to the Danish Academy of sciences a memoir entitled « *Nogle Saetninger om Kraefterne* ». This memoir contained not only views very similar to those of MAYER's, but also the account of original experiments. Unfortunately it was not published until 1856, and even then only in Danish. Moreover it fell short of MAYER and JOULE's work for the same reason as SÉGUIN's : it proved the proportionality of heat and work, but failed to calculate the factor of proportionality.

Indeed the astounding feature of MAYER's philosophical activity was the determination from the very beginning of the mechanical equivalent of heat. That determination was very inaccurate, yet the very fact that MAYER had undertaken it lifted his work from the field of irresponsible theorizing into that of pure physics, and placed him far above SÉGUIN and COLDING, at the very side of JOULE.

6. — *Additional bibliography.*

Robert Mayer. — The main source is the excellent critical

(3) Inventors of balloons; they were born near Annonay.

edition of MAYER's works and letters by JACOB J. WEYRAUCH (2 vols., Stuttgart, 1893). See also WEYRAUCH : R. M. zur Jahrhundertfeier seiner Geburt (105 p., 3 portraits, Stuttgart, 1915).

S. FRIEDLAENDER : R. M. (210 p., Klassiker der Naturwissenschaften, Leipzig, 1905). A. E. HAAS : *Die Entwicklungsgeschichte des Satzes von der Erhaltung der Kraft* (Wien, 1909). WILHELM OSTWALD : *Grosse Männer* (Leipzig, 1910, 61-100). BERNHARD HELL : *M. und das Gesetz von der Erhaltung der Energie* (165 p., Frommanns Klassiker der Philosophie, Stuttgart, 1925).

James Prescott Joule. — As the two volumes of « Scientific papers » and « Joint scientific papers » were edited by the Physical Society of London during JOULE's life-time (1884, 1887) they contain no biographical information, except the portrait, engraved by C. H. JEENS, originally published in *Nature*.

OSBORNE REYNOLDS : *Memoir of James Prescott Joule* (*Manchester Literary and Philosophical Society*; VIII + 196 p., portrait; Manchester, 1892). ALEX. WOOD : *Joule and the study of energy* (VIII + 88 p., London, 1925; *Isis*, 8, 566).

Sadi Carnot. — Réflexions sur la puissance motrice du feu (103 p., portrait, Paris, 1878). This reprint of CARNOT's work of 1824 is followed by a biographical sketch, and by extracts from CARNOT's manuscripts proving that he had actually anticipated MAYER and JOULE, including a determination of the mechanical equivalent of heat (see our facsimile no. VII, and its transcription in § 8).

E. ARIÈS : *L'œuvre scientifique de Sadi Carnot* (160 p., Paris, 1921; *Isis*, 4, 598). *Carnot Centenary commemoration.* (32 p., Engineering foundation, New York, 1925).

Marc Séguin. — *Marc Séguin*, 1786-1875 (20 p., portrait; Comité du monument Marc Séguin, Annonay, 1913).

Ludvig August Colding. — *Nogle Saetninger om Kraefterne* (Academy of sciences of Copenhagen, 1856, 20 p., 1 pl.). *Naturvidenskabelige Betragtninger over Slaegtskabet mellem det aandelige Livs Virksomheder og de almindelige Naturkraefter* (ibidem, 1856, 136-68).

Traduction of COLDING's memoir in Ido, with a preface by WILHELM OSTWALD (20 p., Paris, 1913; *Isis*, 1, 522-24).

7. — *English translation of Mayers' first printed paper* (1842). *Remarks on the forces of inorganic nature* (4).

The following pages are designed as an attempt to answer the questions, What are we to understand by « Forces » ? and how are different forces related to each other ? Whereas the term *matter* implies the possession, by the object to which it is applied, of very definite properties, such as weight and extension ; the term *force* conveys for the most part the idea of something unknown, unsearchable, and hypothetical. An attempt to render the notion of force equally exact with that of matter, and so to denote by it only objects of actual investigation, is one which, with the consequences that flow from it, ought not to be unwelcome to those who desire that their views of nature may be clear and unencumbered by hypotheses.

Forces are causes : accordingly, we may in relation to them make full application of the principle — *causa aequat effectum*. If the cause c has the effect e, then $c = e$; if, in its turn, e is the cause of a second effect f, we have $e = f$, and so on : $c = e = f ... = c$. — In a chain of causes and effects, a term or a part of a term can never, as plainly appears from the nature of an equation, become equal to nothing. This first property of all causes we call their *indestructibility*.

If the given cause c has produced an effect e equal to itself, it has in that very act ceased to be : c has become e; if, after the production of e, c still remained in whole or in part, there must be still further effects corresponding to this remaining cause : the total effect of c would thus be $> e$, which would be contrary to the supposition $c = e$. Accordingly, since c becomes e, and e becomes f, etc., we must regard these various magnitudes as different forms under which one and the same object makes its

(4) Translated from the *Annalen der Chemie und Pharmacie*, vol. 42. p. 233 (May 1842), by G. C. FOSTER, B. A., Lecturer on Natural Philosophy in Anderson's University, Glasgow. Considerable attention having of late been called to the author of this paper, as one of the earliest propounders of the doctrine of the Indestructibility of Force, and especially of the idea of the equivalence of Heat and Work, it will probably interest many readers of the *Philosophical Magazine* to have placed in their hands his earliest publication on the subject. For some account of MAYER and of his further labours, see Prof. TYNDALL's lecture « On Force, » *Phil. Mag.*, S. 4. vol. 24. pp. 64-66. (G. C. F.)

appearance. This capability of assuming various forms is the second essential property of all causes. Taking both properties together, we may say, causes are (quantitatively) *indestructible* and (qualitatively) *convertible* objects.

Two classes of causes occur in nature, which, so far as experience goes, never pass one into another. The first class consists of such causes as possess the properties of weight and impenetrability; these are kinds of Matter : the other class is made up of causes which are wanting in the properties just mentioned, namely Forces, called also Imponderables, from the negative property that has been indicated. Forces are therefore *indestructible, convertible, imponderable objects.*

We will in the first instance take matter, to afford us an example of causes and effects. Explosive gas, H + O, and water, HO, are related to each other as cause and effect, therefore H + O = HO. But if H + O becomes HO, heat, *cal.*, makes its appearance as well as water; this heat must likewise have a cause, *x*, and we have therefore, H + O + *x* = HO + *cal.* It might, however, be asked whether H + O is really = HO, and *x* = *cal.*, and not perhaps H + O = *cal.*, and *x* = HO, whence the above equation could equally be deduced; and so in many other cases. The phlogistic chemists recognized the equation between *cal.* and *x*, or Phlogiston as they called it, and in so doing made a great step in advance; but they involved themselves again in a system of mistakes by putting — *x* in place of O; thus, for instance, they obtained H = HO + *x*.

Chemistry, whose problem it is to set forth in equations the causal connexion existing between the different kinds of matter, teaches us that matter, as a cause, has matter for its effect; but we are equally justified in saying that to force as cause, corresponds force as effect. Since *c* = *e*, and *e* = *c*, it is unnatural to call one term of an equation a force, and the other an effect of force or phenomenon, and to attach different notions to the expressions Force and Phenomenon. In brief, then, if the cause is matter, the effect is matter; if the cause is a force, the effect is also a force.

A cause which brings about the raising of a weight is a force ; its effect (*the raised weight*) is, accordingly, equally a force; or, expressing this relation in a more general form, *separation in space of ponderable objects is a force*; since this force causes the

fall of bodies, we call it *falling force*. Falling force and fall, or, more generally still, falling force and motion, are forces which are related to each other as cause and effect — forces which are convertible one into the other — two different forms of one and the same object. For example, a weight resting on the ground is not a force : it is neither the cause of motion, not of the lifting of another weight; it becomes so, however, in proportion as it is raised above the ground : the cause — the distance between a weight and the earth — and the effect — the quantity of motion produced — bear to each other, as we learn from mechanics, a constant relation.

Gravity being regarded as the cause of the falling of bodies, a gravitating force is spoken of, and so the notions of *property* and of *force* are confounded with each other : precisely that which is the essential attribute of every force — the *union* of indestructibility with convertibility — is wanting in every property : between a property and a force, between gravity and motion, it is therefore impossible to establish the equation required for a rightly conceived causal relation. If gravity be called a force, a cause is supposed which produces effects without itself diminishing, and incorrect conceptions of the causal connexion of things are thereby fostered. In order that a body may fall, it is no less necessary that it should be lifted up, than that it should be heavy or possess gravity; the fall of bodies ought not therefore to be ascribed to their gravity alone.

It is the problem of Mechanics to develope the equations which subsist between falling force and motion, motion and falling force, and between different motions : here we will call to mind only one point. The magnitude of the falling force v is directly proportional (the earth's radius being assumed $= \infty$) to the magnitude of the mass m, and the height d to which it is raised; that is, $v = md$. If the height $d = 1$, to which the mass m is raised, is transformed into the final velocity $c = 1$ of this mass, we have also $v = mc$; but from the known relations existing between d and c, it results that, for the other values of d or of c, the measure of the force v is mc^2; accordingly $v = md = mc^2$: the law of the conservation of *vis viva* is thus found to be based on the general law of the indestructibility of causes.

In numberless cases we see motion cease without having caused

another motion or the lifting of a weight; but a force once in existence cannot be annihilated, it can only change its form: and the question therefore arises. What other forms is force, which we have become acquainted with as falling force and motion, capable of assuming? Experience alone can lead us to a conclusion on this point. In order to experiment with advantage, we must select implements which, besides causing a real cessation of motion, are as little as possible altered by the objects to be examined. If, for example, we rub together two metal plates, we see motion disappear, and heat, on the other hand, make its appearance, and we have now only to ask whether *motion* is the cause of heat. In order to come to a decision on this point, we must discuss the question whether, in the numberless cases in which the expenditure of motion is accompanied by the appearance of heat, the motion has not some other effect than the production of heat, and the heat some other cause than the motion.

An attempt to ascertain the effects of ceasing motion has never yet been seriously made; without, therefore, wishing to exclude *à priori* the hypotheses which it may be possible to set up, we observe only that, as a rule, this effect cannot be supposed to be an alteration in the state of aggregation of the moved (that is, rubbing, etc.) bodies. If we assume that a certain quantity of motion v is expended in the conversion of a rubbing substance m into n, we must then have $m + v = n$, and $n = m + v$; and when n is reconverted into m, v must appear again in some form or other. By the friction of two metallic plates continued for a very long time, we can gradually cause the cessation of an immense quantity of movement; but would it ever occur to us to look for even the smallest trace of the force which has disappeared in the metallic dust that we could collect, and to try to regain it thence? We repeat, the motion cannot have been annihilated; and contrary, or positive and negative, motions cannot be regarded as $= 0$, any more than contrary motions can come out of nothing, or a weight can raise itself.

Without the recognition of a causal connexion between motion and heat, it is just as difficult to explain the production of heat as it is to give any account of the motion that disappears. The heat cannot be derived from the diminution of the volume of the rubbing substances. It is well known that two pieces of ice may

be melted by rubbing them together *in vacuo*; but let any one try to convert ice into water by pressure (5), however enormous. Water undergoes, as was found by the author, a rise of temperature when violently shaken. The water so heated (from 12° to 13°C.) has a greater bulk after being shaken than it had before; whence now comes this quantity of heat, which by repeated shaking may be called into existence in the same apparatus as often as we please? The vibratory hypothesis of heat is an approach towards the doctrine of heat being the effect of motion, but it does not favour the admission of this causal relation in its full generality; it rather lays the chief stress on uneasy oscillations (*unbehagliche Schwingungen*).

If it be now considered as established that in many cases (*exceptio confirmat regulam*) no other effect of motion can be traced except heat, and that no other cause than motion can be found for the heat that is produced, we prefer the assumption that heat proceeds from motion, to the assumption of a cause without effect and of an effect without a cause, — just as the chemist, instead of allowing oxygen and hydrogen to disappear without further investigation, and water to be produced in some inexplicable manner, establishes a connexion between oxygen and hydrogen on the one hand and water on the other.

The natural connexion existing between falling force, motion, and heat may be conceived of as follows. We know that heat makes its appearance when the separate particles of a body approach nearer to each other: condensation produces heat. And what applies to the smallest particles of matter, and the smallest intervals between them, must also apply to large masses and to measurable distances. The falling of a weight is a real diminution of the bulk of the earth, and must therefore without doubt be related to the quantity of heat thereby developed; this quantity of heat must be proportional to the greatness of the weight and its distance from the ground. From this point of view we are very easily led to the equations between falling force, motion, and heat, that have already been discussed.

(5) Since the original publication of this paper, Prof. W. THOMSON has shown that pressure has a sensible effect in liquefying ice (*Phil. Mag.*, S. 3. vol. 37, p. 123); but the experiments of BUNSEN and of HOPKINS have shown that the melting-points of bodies which expand on becoming liquid are raised by pressure, which is all that MAYER's argument requires. G. C. F.

But just as little as the connexion between falling force and motion authorizes the conclusion that the essence of falling force is motion, can such a conclusion be adopted in the case of heat. We are, on the contrary, rather inclined to infer that, before it can become heat, motion — whether simple, or vibratory as in the case of light and radiant heat, etc. — must cease to exist as motion.

If falling force and motion are equivalent to heat, heat must also naturally be equivalent to motion and falling force. Just as heat appears as an *effect* of the diminution of bulk and of the cessation of motion, so also does heat disappear as a *cause* when its effects are produced in the shape of motion, expansion, or raising of weight.

In water-mills, the continual diminution in bulk which the earth undergoes, owing to the fall of the water, gives rise to motion, which afterwards disappears again, calling forth unceasingly a great quantity of heat; and inversely, the steam-engine serves to decompose heat again into motion or the raising of weights. A locomotive engine with its train may be compared to a distilling apparatus; the heat applied under the boiler passes off as motion, and this is deposited again as heat at the axles of the wheels.

We will close our disquisition, the propositions of which have resulted as necessary consequences from the principle « ***causa aequat effectum***, » and which are in accordance with all the phenomena of Nature, with a practical deduction. The solution of the equations subsisting between falling force and motion requires that the space fallen through in a given time, *e.g.* the first second, should be experimentally determined; in like manner, the solution of the equations subsisting between falling force and motion on the one hand and heat on the other, requires an answer to the question, How great is the quantity of heat which corresponds to a given quantity of motion or falling force? For instance, we must ascertain how high a given weight requires to be raised above the ground in order that its falling force may be equivalent to the raising of the temperature of an equal weight of water from 0° to 1°C. The attempt to show that such an equation is the expression of a physical truth may be regarded as the substance of the foregoing remarks.

By applying the principles that have been set forth to the rela-

tions subsisting between the temperature and the volume of gases, we find that the sinking of a mercury column by which a gas is compressed is equivalent to the quantity of heat set free by the compression; and hence it follows, the ratio between the capacity for heat of air under constant pressure and its capacity under constant volume being taken as = 1.421, that the warming of a given weight of water from 0° to 1°C. corresponds to the fall of an equal weight from the height of about 365 metres (1). If we compare with this result the working of our best steam-engines, we see how small a part only of the heat applied under the boiler is really transformed into motion or the raising of weights; and this may serve as justification for the attempts at the profitable production of motion by some other method than the expenditure of the chemical difference between carbon and oxygen — more particularly by the transformation into motion of electricity obtained by chemical means.

8. — *Transcription of the page of Sadi Carnot's manuscripts reproduced in facsimile no. VII.*

These manuscripts were given by CARNOT's family to the French Academy of Sciences in 1878 and extracts were published in the same year (see § 6). Our facsimile and its transcription are borrowed from that publication (p. 89, 94). It is impossible to date that extract exactly; it is posterior to 1824 and anterior to August 24, 1832, when CARNOT died.

« La chaleur n'est autre chose que la puissance motrice, ou plutôt que le mouvement qui a changé de forme. C'est un mouvement dans les particules des corps. Partout où il y a destruction de puissance motrice, il y a, en même temps, production de chaleur en quantité précisément proportionnelle à la quantité de puissance motrice détruite. Réciproquement, partout où il y a destruction de chaleur, il y a production de puissance motrice.

« On peut donc poser en thèse générale que la puissance motrice est en quantité invariable dans la nature, qu'elle n'est jamais, à proprement parler, ni produite, ni détruite. A la vérité, elle

(1) When the corrected specific heat of air is introduced into the calculation this number is increased, and agrees then with the experimental determinations of Mr. JOULE. (G. C. F.)

change de forme, c'est-à-dire qu'elle produit tantôt un genre de mouvement, tantôt un autre; mais elle n'est jamais anéantie.

« D'après quelques idées que je me suis formées sur la théorie de la chaleur, la production d'une unité de puissance motrice nécessite la destruction de 2,70 unités de chaleur.

« Une machine qui produirait 20 unités de puissance motrice par kilogramme de charbon devrait anéantir $\frac{20\times 2.70}{7000}$ de la chaleur développée par la combustion; $\frac{20\times 2.7}{7000} = \frac{8}{1000}$ environ, c'est-à-dire moins de $\frac{1}{100}$. »

Facsimile No. V : Robert Mayer. Photographed from the Annalen der Chemie und Pharmacie (vol. 42, 233-40, Heidelberg, 1842).

Bemerkungen über die Kräfte der unbelebten Natur;

von *J. R. Mayer.*

Der Zweck folgender Zeilen ist, die Beantwortung der Frage zu versuchen, was wir unter „Kräften" zu verstehen haben, und wie sich solche untereinander verhalten. Während mit der Benennung Materie einem Objecte sehr bestimmte Eigenschaften, als die der Schwere, der Raumerfüllung, zugetheilt werden, knüpft sich an die Benennung Kraft vorzugsweise der Begriff des unbekannten, unerforschlichen, hypothetischen. Ein Versuch, den Begriff von Kraft ebenso präcis als den von Materie aufzufassen, und damit nur Objecte wirklicher Forschung zu bezeichnen, dürfte mit den daraus fliefsenden Consequenzen, Freunden klarer hypothesenfreier Naturanschauung nicht unwillkommen seyn.

Kräfte sind Ursachen, mithin findet auf dieselbe volle Anwendung der Grundsatz: *causa aequat effectum*. Hat die Ursache c die Wirkung e, so ist $c = e$; ist e wieder die Ursache einer andern Wirkung f, so ist $e = f$, u. s. f. $c = e = f \ldots = c$. In einer Kette von Ursachen und Wirkungen kann, wie aus der Natur einer Gleichung erhellt, nie ein Glied oder ein Theil eines Gliedes zu Null werden. Diese erste Eigenschaft aller Ursachen nennen wir ihre *Unzerstörlichkeit.*

Hat die gegebene Ursache c eine ihr gleiche Wirkung e hervorgebracht, so hat eben damit c zu seyn aufgehört; c ist zu e geworden; wäre nach der Hervorbringung von e, c ganz oder einem Theile nach noch übrig, so müfste dieser ruckbleibenden Ursache noch weitere Wirkung entsprechen, die Wirkung von c uberhaupt also e ausfallen, was gegen die Voraussetzung $c = e$. Da mithin c in e, e in f u. s. w. übergeht so müssen wir diese Gröfsen als verschiedene Erscheinungsformen eines und desselben Objectes betrachten. Die Fähigkeit, verschiedene Formen annehmen zu können, ist die zweite wesentliche Eigenschaft aller Ursachen. Beide Eigenschaften zusammengefafst sagen wir: Ursachen sind (quantitativ) *unzerstörliche* und (qualitativ) *wandelbare* Objecte.

Zwei Abtheilungen von Ursachen finden sich in der Natur vor, zwischen denen erfahrungsmäfsig keine Uebergange stattfinden. Die eine Abtheilung bilden die Ursachen, denen die Eigenschaft der Ponderabilität und Impenetrabilität zukommt — Materien; die andere die Ursachen, denen letztere Eigenschaften fehlen, — Kräfte, von der bezeichnenden negativen Eigenschaft auch Imponderabilien genannt. Kräfte sind also: *unzerstörliche, wandelbare, imponderable Objecte.*

Wir wollen zuerst die Materien zur Aufstellung eines Beispiels von Ursachen und Wirkungen benützen. Knallgas, $H + O$, und Wasser HO verhalten sich wie Ursache und Wirkung, also $H + O = HO$. Wird aus $H + O$, HO, so kommt aufser Wasser noch Warme, cal. zum Vorschein; diese Wärme mufs ebenfalls eine Ursache, x, haben; es ist also: $H + O + x = H + \text{cal.}$; es könnte sich nun fragen, ist wirklich $H + O = HO$, und $x = \text{cal.}$, und nicht etwa $H + O = \text{cal.}$, und $x = HO$, worauf sich aus obiger Gleichung ebenfalls schliefsen liefse u. dgl. m. Die Phlogistiker erkannten die Gleichung von cal. u. x das sie Phlogiston nannten, und thaten damit einen grofsen Schritt vorwärts, verwickelten sich aber wieder dadurch in ein System

von Irrthümern, dafs sie statt O, $-x$ setzten, also beispielsweise $H = HO + x$ erhielten.

Die Chemie, deren Gegenstand es ist, den zwischen den Materien stattfindenden ursächlichen Zusammenhang in Gleichungen zu entwickeln, lehrt uns, dafs einer Materie als Ursache eine Materie als Wirkung zukomme; aber mit gleichem Rechte kann man auch sagen, dafs einer Kraft als Ursache, eine Kraft als Wirkung entspreche. Da $c = e$, und $e = c$, so ist es naturwidrig, das eine Glied, wo Gleichung eine Kraft, das andere eine Wirkung von Kraft oder Erscheinung zu nennen, und an die Ausdrücke Kraft und Erscheinung verschiedene Begriffe zu knüpfen; kurz also: ist die Ursache eine Materie, so ist auch die Wirkung eine solche; ist die Ursache eine Kraft, so ist auch die Wirkung eine Kraft.

Eine Ursache, welche die Hebung einer Last bewirkt, ist eine Kraft; ihre Wirkung, *die gehobene Last*, ist also ebenfalls *eine Kraft;* allgemeiner ausgedrückt heifst dies: *räumliche Differenz ponderabler Objecte ist eine Kraft;* da diese Kraft den Fall der Körper bewirkt, so nennen wir sie *Fallkraft.* Fallkraft und Fall, und allgemeiner noch Fallkraft und Bewegung sind Kräfte, die sich verhalten wie Ursache und Wirkung, Kräfte, die in einander übergehen, zwei verschiedene Erscheinungsformen eines und desselben Objectes. Beispiel: eine auf dem Boden ruhende Last ist keine Kraft; sie ist weder Ursache einer Bewegung, noch der Hebung einer andern Last, wird diefs aber in dem Mafse, in welchem sie über den Boden gehoben wird; die Ursache, der Abstand einer Last von der Erde und die Wirkung, das erzeugte Bewegungsquantum stehen, wie die Mechanik weifs, in einer beständigen Gleichung.

Indem man die Schwere als Ursache des Falls betrachtet, spricht man von einer Schwerkraft und verwirrt so die Begriffe von Kraft und Eigenschaft; gerade das, was jeder Kraft wesentlich zukommen mufs, die *Vereinigung* von Unzerstörlichkeit und

Wandelbarkeit, geht jedweder Eigenschaft ab; zwischen einer Eigenschaft und einer Kraft, zwischen Schwere und Bewegung lafst sich defshalb auch nicht die für ein richtig gedachtes Causalverhältnifs nothwendige Gleichung aufstellen. Heifst man die Schwere eine Kraft, so denkt man sich damit eine Ursache, welche, ohne selbst abzunehmen, Wirkung hervorbringt, hegt damit also unrichtige Vorstellungen über den ursächlichen Zusammenhang der Dinge. Um dafs ein Körper fallen könne, dazu ist seine Erhebung nicht minder nothwendig, als seine Schwere, man darf daher auch letzterer allein den Fall der Körper nicht zuschreiben.

Es ist der Gegenstand der Mechanik, die zwischen Fallkraft und Bewegung, Bewegung und Fallkraft, und die zwischen den Bewegungen unter sich bestehenden Gleichungen zu entwickeln; wir erinnern hier nur an einen Punkt. Die Gröfse der Fallkraft v steht — den Erdhalbmesser $= \infty$ gesetzt — mit der Gröfse der Masse m und mit der ihrer Erhebung d, in geradem Verhältnisse; $v = md$. Geht die Erhebung $d = 1$ der Masse m in Bewegung dieser Masse von der Endgeschwindigkeit $c = 1$ über, so wird auch $v = mc$; aus den bekannten zwischen d und c stattfindenden Relationen ergiebt sich aber für andere Werthe von d oder c, mc^2 als das Mafs der Kraft v; also $v = md = mc^2$; das Gesetz der Erhaltung lebendiger Kräfte finden wir in dem allgemeinen Gesetze der Unzerstörbarkeit der Ursachen begründet.

Wir sehen in unzähligen Fällen eine Bewegung aufhören, ohne dafs letztere eine andere Bewegung, oder eine Gewichtserhebung hervorgebracht hätte; eine einmal vorhandene Kraft kann aber nicht zu Null werden, sondern nur in eine andere Form übergehen und es fragt sich somit, welche weitere Form die Kraft, welche wir als Fallkraft und Bewegung kennen gelernt, anzunehmen fähig sey? Nur die Erfahrung kann uns hierüber Aufschlufs ertheilen. Um zweckmäfsig zu experimenti-

ren, müssen wir Werkzeuge wählen, welche neben dem, dafs sie eine Bewegung wirklich zum Aufhören bringen, von den zu untersuchenden Objecten möglichst wenig verändert werden. Reiben wir z. B. zwei Metallplatten an einander, so werden wir Bewegung verschwinden, Wärme dagegen auftreten sehen und es fragt sich jetzt nur, ist die *Bewegung* die Ursache von Wärme. Um uns über dieses Verhältnifs zu vergewissern, müssen wir die Frage erörtern, hat nicht in den zahllosen Fällen, in denen unter Aufwand von Bewegung Wärme zum Vorschein kommt, die Bewegung eine andere Wirkung als die Wärmeproduktion und die Wärme eine andere Ursache als die Bewegung?

Ein Versuch, die Wirkungen der aufhörenden Bewegung nachzuweisen, wurde noch nie ernstlich angestellt; ohne die möglicherweise aufzustellenden Hypothesen zum Voraus wiederlegen zu wollen, machen wir nur darauf aufmerksam, dafs diese Wirkung in eine Veränderung des Aggregationszustandes der bewegten, sich reibenden x x Körper in der Regel nicht gesetzt werden könne. Nehmen wir an, es werde ein gewisses Quantum von Bewegung v, dazu verwendet, eine reibende Materie m, in n zu verwandeln, so müfste $m + v = n$, und $n = m + v$ seyn, und bei der Rückführung von n in m müfste v in irgend eine Form wieder zu Tage kommen. Durch sehr lange fortgesetztes Reiben zweier Metallplatten können wir nach und nach ein ungeheures Quantum von Bewegung zum Aufhören bringen: kann uns aber beifallen, in dem gesammelten Metallstaub auch nur eine Spur der entschwundenen Kraft wieder finden, und daraus reduciren zu wollen? Zu Nichts, wir wiederholen, kann die Bewegung nicht geworden seyn und entgegengesetzte, oder positive und negative Bewegungen können nicht $= 0$ gesetzt werden, so wenig aus 0 entgegengesetzte Bewegungen entstehen können, oder ein Last sich von selbsten hebt.

So wenig sich, ohne Anerkennung eines ursächlichen Zusammenhanges zwischen Bewegung und Wärme, von der ent-

schwundenen Bewegung irgend Rechenschaft geben läfst, so wenig läfst sich auch ohne jene die Entstehung der Wärme erklären. Aus der Volumensverminderung der sich reibenden Körper kann dieselbe nicht hergeleitet werden. Man kann bekanntlich durch Zusammenreiben zwei Eisstücke im luftleeren Raume schmelzen; man versuche nun, ob man durch den unerhörtesten Druck Eis in Wasser verwandeln könne? Wasser erfährt, wie der Verfasser fand, durch starkes Schütteln eine Temperaturerhöhung Das erwärmte Wasser (von 12° und 13° C.) nimmt nach dem Schütteln ein gröfseres Volumen ein, als vor demselben; woher kommt nun die Wärmemenge, welche sich durch wiederholtes Schütteln in demselben Apparate beliebig oft hervorbringen läfst? Die thermische Vibrationshypothese inclinirt zu dem Satze, dafs Wärme die Wirkung von Bewegung sey, würdigt aber dieses Causalverhältnifs im vollen Umfange nicht, sondern legt das Hauptgewicht auf unbehagliche Schwingungen.

Ist es nun ausgemacht, dafs für die verschwindende Bewegung in vielen Fällen (exceptio confirmat regulam) keine andere Wirkung gefunden werden kann, als die Wärme, für die entstandene Wärme keine andere Ursache als die Bewegung, so ziehen wir die Annahme, Wärme entsteht aus Bewegung, der Annahme einer Ursache ohne Wirkung und einer Wirkung ohne Ursache vor, wie der Chemiker statt H und O ohne Nachfrage verschwinden, und Wasser auf unerklärte Weise entstehen zu lassen, einen Zusammenhang zwischen H und O einer- und Wasser anderseits statuirt.

Den natürlichen, zwischen Fallkraft, Bewegung und Wärme bestehenden Zusammenhang können wir uns auf folgende Weise anschaulich machen. Wir wissen, dafs Wärme zum Vorschein kommt, wenn die einzelnen Massentheile eines Körpers sich näher rücken; Verdichtung erzeugt Wärme; was nun für die kleinsten Massentheile und ihre kleinsten Zwischenräume gilt, mufs wohl auch seine Anwendung auf grofse Massen und mefs-

bare Räume finden. Das Herabsinken einer Last ist eine wirkliche Volumensverminderung des Erdkörpers, mufs also gewifs mit der dabei sich zeigenden Wärme im Zusammenhange stehen: diese Wärme wird der Gröfse der Last und ihrem Abstande genau proportional seyn müssen. Von dieser Betrachtung wird man ganz einfach zu der besprochenen Gleichung von Fallkraft. Bewegung und Wärme geführt.

So wenig indessen aus dem zwischen Fallkraft und Bewegung bestehenden Zusammenhange geschlossen werden kann: das Wesen der Fallkraft sey Bewegung, so wenig gilt dieser Schlufs für die Wärme. Wir möchten vielmehr das Gegentheil folgern, dafs um zu Wärme werden zu können, die Bewegung, — sey sie eine einfache, oder eine vibrirende, wie das Licht, die strahlende Wärme etc., — aufhören müsse, Bewegung zu seyn.

Wenn Fallkraft und Bewegung gleich Wärme, so mufs natürlich auch Wärme gleich Bewegung und Fallkraft seyn. Wie die Wärme als Wirkung entsteht, bei Volumsverminderung und aufhörender Bewegung, so verschwindet die Wärme als Ursache unter dem Auftreten ihrer Wirkungen, der Bewegung, Volumsvermehrung, Lasterhebung.

In den Wasserwerken liefert die, auf Kosten der Volumensverminderung, welche der Erdkörper durch den Fall des Wassers beständig erleidet, entstehende und wieder verschwindende Bewegung, fortwährend eine bedeutende Menge von Wärme: umgekehrt dienen wieder die Dampfmaschinen zur Zerlegung der Wärme in Bewegung oder Lasterhebung. Die Locomotive mit ihrem Convoi ist einem Destillirapparate zu vergleichen; die unter dem Kessel angebrachte Wärme geht in Bewegung über, und diese setzt sich wieder an den Axen der Räder als Wärme in Menge ab.

Wir schliefsen unsere Thesen, welche sich mit Nothwendigkeit aus dem Grundsatze „causa aequat effectum" ergeben und mit allen Naturerscheinungen in vollkommenen Einklange stehen, mit einer praktischen Folgerung. — Zur Auflösung der zwischen

Fallkraft und Bewegung stauhabenden Gleichungen mufste der Fallraum für eine bestimmte Zeit, z. B. für die erste Secunde durch das Experiment bestimmt werden; gleichermafsen ist zur Auflösung der zwischen Fallkraft und Bewegung einer- und der Wärme anderseits bestehenden Gleichungen die Frage zu beantworten, wie grofs das einer bestimmten Menge von Fallkraft oder Bewegung entsprechende Wärmequantum sey. Z. B. wir müssen ausfindig machen, wie hoch ein bestimmtes Gewicht über den Erdboden erhoben werden müsse, dafs seine Fallkraft aequivalent sey der Erwärmung eines gleichen Gewichtes Wasser von 0° auf 1° C.? Dafs eine solche Gleichung wirklich in der Natur begründet sey, kann als das Resume des bisherigen betrachtet werden.

Unter Anwendung der aufgestellten Sätze auf die Wärme- und Volumensverhältnisse der Gasarten findet man die Senkung einer ein Gas comprimirenden Quecksilbersäule gleich der durch die Compression entbundenen Wärmemenge und es ergiebt sich hieraus, — den Verhaltnifsexponenten der Capacitäten der atmosphärischen Luft unter gleichem Drucke und unter gleichem Volumen = 1,421 gesetzt, dafs dem Herabsinken eines Gewichtstheiles von einer Höhe circa 365^m, die Erwärmung eines gleichen Gewichttheiles Wasser von 0° auf 1° entspreche. Vergleicht man mit diesem Resultate die Leistungen unserer besten Dampfmaschinen, so sieht man, wie nur ein geringer Theil der unter dem Kessel angebrachten Wärme in Bewegung oder Lasterhebung wirklich zersetzt werde und dies könnte zur Rechtfertigung dienen, für die Versuche, Bewegung auf anderem Wege als durch Aufopferung der chemischen Differenz von C und O, namentlich also durch Verwandlung der auf chemischem Wege gewonnenen Elektricität in Bewegung, auf erspriefsliche Weise darstellen zu wollen.

Ausgegeben am 31ten Mai 1842.

Facsimile No. vi : J. P. Joule. Photographed from the Report of the meeting of the British Association, Cork, 1843. Transactions of the Sections, p. 33.

On the Calorific Effects of Magneto-Electricity, and the Mechanical Value of Heat. *By* J. P. Joule.

Although it had been long known that fine platinum wire can be ignited by magneto-electricity, it still remained a matter of doubt whether heat was evolved by the *coils* in which the magneto-electricity was generated: and it seemed indeed not unreasonable to suppose that *cold* was produced there, in order to make up for the heat evolved by the other parts of the circuit. The author had endeavoured therefore to clear up this uncertainty by experiment. His apparatus consisted of a small compound electro-magnet, immersed in water, revolving between the poles of a powerful stationary magnet. The magneto-electricity developed in the coils of the revolving electro-magnet was measured by an accurate galvanometer; and the temperature of the water was taken before and after each experiment by a very delicate thermometer. The influence of the temperature of the surrounding atmospheric air was guarded against by covering the revolving tube with flannel, &c., and by the adoption of a system of interpolation. By an extensive series of experiments with the above apparatus the author succeeded in proving that heat is evolved by the coils of the magneto-electrical machine, as well as by any other part of the circuit, in proportion to the resistance to conduction of the wire and the square of the current; the magneto-, having, under comparable circumstances, the same calorific power as the voltaic electricity. Prof. Jacobi, of St. Petersburgh, had shown that the motion of an electro-magnetic engine generates magneto-electricity in opposition to the voltaic current of the battery. The author had observed the same phænomenon on arranging his apparatus as an electro-magnetic engine; but had found that no additional heat was evolved on account of the conflict of forces in the coil of the revolving electro-magnet, and that the heat evolved by the coil remained, as before, proportional to the square of the current. Again, by turning the machine contrary to the direction of the attractive forces, so as to *increase* the intensity of the voltaic current by the assistance of the magneto-electricity, he found that the evolution of heat was still proportional to the square of the current. The author discovered, therefore, that the heat evolved by the voltaic current is invariably proportional to the square of the current, however the intensity of the current may be varied by magnetic induction. But Dr. Faraday had shown that the chemical effects of the current are simply as its quantity. Therefore he concluded that in the electro-magnetic engine, a part of the heat due to the chemical actions of the battery is lost by the circuit, and converted into mechanical power; and that when the electro-magnetic engine is turned *contrary* to the direction of the attractive forces, a *greater* quantity of heat is evolved by the circuit than is due to the chemical reactions of the battery, the overplus quantity being produced by the conversion of the mechanical force exerted in turning the machine. By a dynamometrical apparatus attached to his machine, the author has ascertained that, in all the above cases, a quantity of heat, capable of increasing the temperature of a pound of water by one degree of Fahrenheit's scale, is equal to a mechanical force capable of raising a weight of about 838 pounds to the height of one foot.

Facsimile No. vii : Sadi Carnot. Manuscript note in the Archives of the Institut, Paris. Date c. 1824-32.

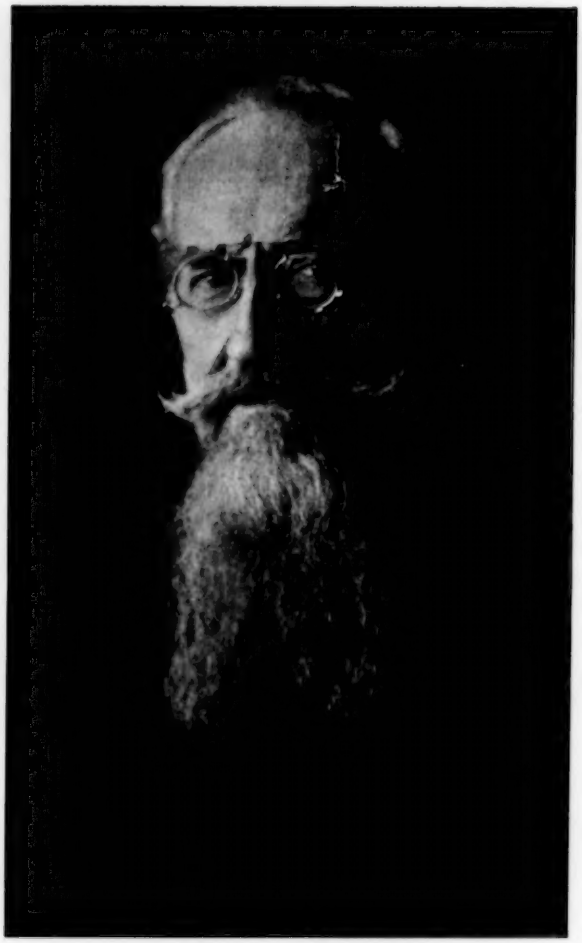
La Chaleur n'est autre chose que la puissance motrice ou plutôt que le mouvement qui a changé de forme. C'est un mouvement partout où il y a destruction de Pm il y a en même temps production de chaleur en quantité précisément proportionnelle à la Pm détruite réciproquement partout où il y a destruction de chaleur il y a production de Pm.

On peut donc poser en thèse générale que la Pm est en quantité invariable dans la nature qu'elle n'est jamais à proprement parler ni produite, ni détruite, qu'elle est à la vérité elle change de forme c.à.d. qu'elle produit tantôt un genre de mouvement tantôt un autre mais qu'elle existe toujours mais elle n'est jamais anéantie.

D'après quelques idées que je me suis formées sur la théorie de la chaleur, la production d'une unité de puissance motrice nécessite la destruction de 2,70 unités de chaleur.

Une machine qui produirait 20 unités de Pm par kilog de charbon devrait anéantir $\frac{20 \cdot 2{,}70}{7000}$ de la chaleur développée par la

Combustion $\frac{20 \cdot 2{,}7}{7000} = \frac{1}{1000}$ environ 6 à 7 moins de $\frac{1}{100}$



EDMUND HOPPE (1854-1928)

Edmund Hoppe

(geb. 1854, 02, 25, gest. 1928, 08, 12.)

Am 12. August 1928 starb in voller Geisteskraft und reger wissenschaftlicher Tätigkeit der fünfundsiebzigjährige Historiker der exakten Wissenschaften Prof. Dr. EDMUND HOPPE. Mit ihm verschwand aus dem Göttinger Gelehrtenkreis eine besonders feine und liebenswürdige Persönlichkeit, eine solche, die sich im Gedächtnis derjenigen, die sie einmal kennengelernt haben, in dauerhaften Zügen einprägt.

Er wurde am 25. Februar 1854 in Burgdorf bei Celle, in der Provinz Hannover, geboren. Sein Vater war Geistlicher; auf das religiöse Moment in der Erziehung seines Sohnes legte er grossen Wert : hierin finden wir die Wurzel nicht nur seines unerschütterlichen lutherischen Glaubens, sondern auch seines lebhaften Interesses, das er sein Leben lang theologischen Diskussionen entgegenbrachte; diese Seite seiner Tätigkeit hat ihn in nicht unbeträchtlichem Masse beschäftigt (1) und seine Einstellung zur Naturphilosophie stark beeinflusst, wie besonders aus seiner populär gehaltenen Darstellung « vom Werden der Welt » (2) ersichtlich ist.

Indessen wurde er nicht Theologe, sondern widmete sich in den Jahren 1873-1876 in Göttingen und Leipzig dem Studium der Naturwissenschaften. Schon im sechsten Semester promovierte er in Göttingen und blieb sofort danach bei RIECKE als Assistent am physikalischen Institut. In dieser Stellung bestand er das Examen pro facultate docendi mit dem ersten Grad in Mathematik, Physik und Religion und nahm schon 1877 einen Ruf nach Hamburg an die Gelehrtenschule des Johanneums an. Dort war er bis 1896 tätig, von 1894 an als Professor; von 1896 bis 1919 wirkte er am Wilhelm-Gymnasium in Hamburg.

In den ersten Jahren seiner wissenschaftlichen Tätigkeit führte

---

(1) Auf theologischem Gebiet sind von HOPPE mehrere Bücher und Arbeiten erschienen, von denen die umfangreichsten sind : *Natur und Offenbarung*, Hannover, 2. Aufl., 1904 und *Glauben und Wissen*, Gütersloh, BERTELSMANN, 2. Aufl. 1922.

(2) *Unser Wissen vom Werden der Welt*, Bielefeld 1908.

er einige experimentelle Untersuchungen aus auf dem Gebiet der elektromagnetischen Induktionserscheinungen. Er schrieb auch eine wertvolle, später von Prof. JACKSON ins Amerikanische neu bearbeitete Monographie : *Die Akkumulatoren der Elektrizität*. (3) Aber bald war sein Interesse für die geschichtliche Entwicklung seines Forschungsgebietes wach. Dank seiner ausgedehnten humanistischen Bildung, seiner vollkommenen Beherrschung der lateinischen und auch der griechischen Sprache, war er imstande, in aller methodischen Strenge die Originalarbeiten nachzuschlagen und 1884 eine *Geschichte der Elektrizität* (4) herauszubringen, die bereits die Hauptmerkmale seiner späteren historischen Produktion aufweist : vor allen Dingen eine starke, auf das Zurückgreifen nach den Quellen gestützte Selbständigkeit der Auffassung und des Urteils. In der historischen Forschung hatte er offenbar von dieser Zeit an seinen Weg gefunden; abgesehen von seinen theologischen Schriften ist nur noch auf dem Gebiet der Physik ein aus seinem Unterricht entstandenes kleines *Lehrbuch der Physik* (5) (1894) zu erwähnen.

Die Frage nach der Natur der elektrischen Kraft, ob Nah- oder Fernwirkung, hat verhältnismässig früh in der Entwicklung der Elektrizitätslehre eine grosse Rolle gespielt; die Tragweite dieses Problems ragt übrigens über den Bereich der elektromagnetischen Wirkungen hinaus und gewann bereits viel früher, mit GALILEI, KEPLER, NEWTON und anderen eine grössere und allgemeinere Bedeutung. Dem Historiker der Elektrizitätslehre lag mithin die genauere Untersuchung dieser Frage als eine verlockende Aufgabe nahe : 1901 erschien eine grössere Abhandlung *Zur Geschichte der Fernwirkung*. (6)

Die Vorarbeiten dazu gaben HOPPE Anlass, sich mit EULER eingehend zu beschäftigen. Nun war HOPPE, wie wir schon wissen, auch in der Philosophie lebhaft interessiert; und hier kam ihm seine Vielseitigkeit besonders zu Nutze : aus der vielseitigen Persönlichkeit EULERS griff er den Philosophen heraus und aus den einzelnen, in unzählbaren Schriften zerstreuten, meist wenig beachteten Äusserungen über Erkenntnistheorie,

(3) Berlin, SPRINGER, 3. Aufl. 1898.
(4) Leipzig, BARTH, 1884.
(5) Leipzig, BARTH, 1894.
(6) Programm des Wilhelm-Gymnasiums, Hamburg 1901.

Metaphysik, Psychologie, Natur- und Religionsphilosophie, rekonstruierte er ein reizvolles, lebendiges Bild der EULERschen Gedankenwelt. (7) An Hand dieses Materiales konnte er dann darauf aufmerksam machen, dass EULER als Bekämpfer der LEIBNIZ-WOLFFschen Anschauungen, neben HUME eine vielleicht nicht unbedeutende Rolle in der Vorbereitung der KANTschen Ideen gespielt haben mag.

In der nachfolgenden Zeit studierte er hauptsächlich die Geschichte der Mathematik und Naturwissenschaften im Altertum, vor allem bei den Griechen. Die Ergebnisse seiner unermüdlichen Forschung und die oft von der Tradition abweichenden Ansichten, zu denen er durch das Studium der Quellen geführt wurde, hat er bereits 1911 teilweise zusammengefasst in dem Werke *Mathematik und Astronomie im klassischen Altertum.* (8)

Im Jahre 1919 kam die Hamburger Lehrtätigkeit HOPPES zum Abschluss. Auf sein akademisches Leben konnte er wohl mit Zufriedenheit zurückblicken; während dieser vierzig Jahre hatte er mehr als seine Lehrerpflicht erfüllt. Denn er begnügte sich nicht mit seinem amtlichen Unterricht, sondern wandte sich noch in Vorträgen und populären Vorlesungen, namentlich im « Hamburgischen Vorlesungswesen », zu einem weiteren Publikum. Eifrig nahm er auch Teil an den Arbeiten der Mathematischen Gesellschaft, zu deren Jahrverwalter er mehrmals gewählt wurde. Ein vortrefflicher Lehrer war er : konnte seine ungemeine Vortragskunst die Begeisterung und Liebe, die er selbst für die Wissenschaft fühlte, auch bei den jungen Zuhörern erwecken. Manche seiner Schüler, die jetzt zu den ausgezeichneten Mathematikern und Physikern Deutschlands zählen oder sogar, wie der Göttinger Physiker und Nobelpreisträger J. FRANCK weltberühmt sind, verdanken HOPPE ihre erste mathematische Ausbildung.

Von Ruhestand konnte für einen Mann wie HOPPE nicht die Rede sein : er bekam einen Lehrauftrag an der Universität Göttingen und hielt dort bis zu seinem Tode Vorlesungen über Geschichte der exakten Wissenschaften. Damit war ein lang gehegter Wunsch erfüllt : mit jugendlicher Begeisterung widmete er jetzt nicht nur als Forscher sondern auch noch als Lehrer

(7) *Die Philosophie Leonhard Eulers*, Gotha, PERTHES, 1904.

(8) Heidelberg 1911 (Bd. 1 der Bibliothek der klassischen Altertumswissenschaften).

seiner Lieblingswissenschaft seine ganze Energie. Als Forscher zeigte er immer dieselbe fruchtbare und umfassende Tätigkeit. In den letzten Jahren seines Lebens gab er einige Bücher heraus, die das Gesamtergebnis jahrelanger Einzelforschung im Zusammenhang darstellen : Es sind zwei *Geschichten der Physik*, die erste in Buchform, (9) die andere als Artikel des GEIGER-SCHEEL-schen *Handbuchs der Physik* (10) und eine kleine, aber inhaltreiche *Geschichte der Optik*. (11) Ferner darf die musterhafte Biographie OTTO VON GUERICKES (12) nicht unerwähnt bleiben. Noch vor seinem Tode erschien schon eine französische Übersetzung der *Geschichte der Physik*. (13)

Als Lehrer konnte er freilich nicht hoffen, eine Schule zu begründen. Noch lange wird man geduldig warten müssen, bis die Geschichte der Wissenschaften von Wissenschaftlern und Historikern als selbständiges und gleichberechtigtes Forschungsgebiet allgemein anerkannt wird. HOPPES Zuhörerschaft bestand aus jungen Studenten der Mathematik, der Naturwissenschaften, vielleicht auch der Philosophie, die seine Vorlesung mehr als Kuriosum bezw. Erholung neben den schweren Fachvorlesungen und Übungen in ihren Studienplan aufnahmen. Dieses Zustandes war HOPPE sich völlig bewusst; weder Zeit noch Mühe sparte er, um seine Vorträge den Bedürfnissen der Zuhörer anzupassen, um sie zu belehren und zu interessieren, ohne indessen den Boden strenger geschichtlicher Methodik zu verlassen. Dank einem aussergewöhnlichen Vortragstalent erzielte er in dieser schwierigen, undankbaren Aufgabe grossen Erfolg. Das Hören seiner Vorlesungen war ein reiner Genuss : in klarer, sachlicher, aber auch lebhafter, mit feinem Humor oder derber Ironie gewürzter Darstellung, belebte er die bunte Folge vergangener Denkergestalten. An Hand einfacher, das Wesentliche bietender Beispiele legte er den Grundgedanken der Theorien und Entdeckungen klar; übrigens waren diese Beispiele nicht etwa ad hoc erfunden bezw. aufgestellt, sondern immer gewissenhaft aus den Originalarbeiten

(9) Braunschweig, VIEWEG 1926.

(10) *Handbuch der Physik*, Bd. 1, Berlin, SPRINGER, 1927.

(11) Leipzig, WEBER, 1926 (Webers illustrierte Handbücher).

(12) Berlin, O. SALLE, 1927 (Mathematisch-naturwissenschaftlich-technische Bücherei, Bd. 7).

(13) *Histoire de la Physique*, trad. par H. BESSON, 672 p., Paris, PAYOT, 1928. (Bibliothèque scientifique).

entnommen und unter Weglassen irrelevanter Einzelheiten in der Weise behandelt, dass der Gedankengang des Verfassers deutlich hervorgehoben wurde. (14) Von dieser, vom pädagogischen Standpunkt sehr bemerkenswerten Darstellungsweise finden sich auch in seinen Veröffentlichungen Anwendungen, nicht aber in so ausgeprägtem Masse wie in seinem mündlichen Unterricht. Als frappantes Beispiel des Eindruckes, den er auf seine Zuhörer machte, möchte ich eine persönliche Erinnerung anführen.

Eines Tages am Anfang des Semesters wurde ich auf der Treppe des « Auditoriums » von einem offenbar neu angekommenen älteren amerikanischen Herrn angeredet, der mir verzweifelt erzählte, dass er eine gewisse mathematische Vorlesung hören wollte, dass er aber nirgendwo erfahren konnte, in welchem Hörsaal sie stattfand. Da ich nun auch nicht Bescheid wusste und ihn ziemlich hilflos sah, so schlug ich ihm ohne besondere Absicht vor, mit mir gleich ins HOPPEsche Kolleg zu gehen, falls er nichts anderes vorhabe. Er kam auch mit... und von jenem Tage an hörte er pünktlich die ganze Vorlesung, und zwar sass er immer wegen seiner mangelhaften Sprachkenntnis auf der ersten Bank, um möglichst kein Wort zu verlieren.

Auf die sich oft gegen die Tradition erhebenden Ansichten und Auffassungen, die HOPPE in seinen Arbeiten, Büchern und Vorlesungen verteidigte, näher einzugehen, fällt aus dem Rahmen des vorliegenden Nachrufes. Es wird einem natürlich kaum möglich sein, sich in allem mit ihm einverstanden zu erklären : in seinem Bestreben, einerseits die Stetigkeit des Fortschrittes zu betonen, andererseits mit der peinlichsten Genauigkeit das allererste Auftauchen der grossen Entdeckungen und neuen Begriffsbildungen festzustellen, wurde er oft dazu geführt, die Bedeutung der « grossen Männer », wie z.B. GALILEI und NEWTON übermässig herabzusetzen und in seiner Beurteilung ihrer Leistungen keine genügende Rücksicht zu nehmen auf den Unterschied zwischen der blossen, nicht weiter verfolgten Erfindung einer neuen Tatsache, die der « Vorläufer » unbeachtet ankündigt und derselben gründlich untersuchten, zur Grundlage einer neuen Weltanschauung gemachten Entdeckung, die den Genius kennzeichnet. Das sind aber nur Übertreibungen einer an und für

(14) Wie man sieht, unterscheidet sich diese Methode wesentlich von derjenigen welche E. MACH z. B. in seiner *Mechanik* befolgt.

sich lobenswerten Tendenz, durch strenges Quellenstudium zu einer unabhängigen Auffassung der Probleme zu gelangen. Diese Tendenz verleiht allen seinen Schriften den Reiz einer sachlichen, anregenden Originalität.

Ein anderer merkwürdiger Zug der HOPPEschen Leistungen ist ihre umfassende Vielseitigkeit, ihr humanistischer Geist. Ungeschwächt noch im hohen Alter blieb der weite Wissensdrang erhalten. Mit erstaunlicher Anpassungsfähigkeit hielt er noch mir der schnellen, umwälzenden Entwicklung der modernen Physik Schritt : Geburt und Blühen der Relativitätstheorie, sogar das Anfangsstadium der Quantenmechanik hat er noch verständnisvoll erlebt und in froher Anerkennung begrüsst. In seinen Göttinger Jahren war er immer ein treuer Gast der mathematischen Gesellschaft und der physikalischen und astronomischen Kolloquia. Überall machte ihn sein schlichter, bescheidener, aufrichtiger Charakter, seine sich auch in der Beteiligung an Wohltätigkeitswerken äussernde Güte und Bereitwilligkeit von Kollegen und Studenten hochgeachtet und beliebt.

Und alle, Schüler und Kollegen, werden seiner immer mit Rührung gedenken, des ergebenen, begeisterten Lehrers, des unermüdlichen, verdienstvollen Forschers, der feinen, lächelnden Humanistengestalt.

(*Universität Göttingen*). L. ROSENFELD.

Of the cylinder called the horologe of travelers

In the catalogues of collections of medieval manuscripts I have more than once noted descriptions of a treatise or treatises « concerning the construction of the cylinder called the Horologe of Travelers. (1) »

The reference is not, as one might at first think but for the age of the manuscripts, to some time-piece after the order of the modern watch, but to a portable cylindrical form of sun dial, of which the main idea at least appears to go back to the days of HERMANN THE LAME who died in 1054. So far as I know, there has been no modern treatment of the matter, and I have not yet examined the manuscripts to ascertain how far they are identical with one another and whether they are the same treatise as, or a fragment of, the *De utilitatibus astrolabii* of HERMANN THE LAME.

But a Vatican maniscript contains what at least purports to

---

(1) A few examples of its occurence in the MSS are : at Oxford, Ashmole 1522, early 14th century, fols. 178-181, « Incipit tractatus Chilindri quod horologium dicitur viatorum. Capitulum primum de formatione corporis chilindri quantum ad hoc quod spectat ad vertitorem. Investigantibus chilindri dispositionem... » Digby 167, 14th century, fols. 60-62, Incipit, « Investigantibus chilindri composicionem qui dicitur horologium viatorum sumendum est lignum maxime solidum... Laud. Misc. 644, early 14th century, fols. 219-221, « Investigantibus nature chilindri compositionem qui dicitur Orologium viatorum... / ... et sic terminatur chilindri compositio. Explicit chilindri compositio. » University College 41, 14th century, fols. 35-36. De compositione Cylindri, cum tabulis altitudinem solis exhibentibus in civitate Oxon. London et Exon. At Geneva MS 80, probably 15th century, Tractatus cylindri seu horologium viatorum. At Munich MS CLM 14836, 11th century, fols. 1-3, « Cylindrus, » opening, « Componitur quoddam simplex et paruulum viatoribus horologicum instrumentum... » and closing, « Horologi huius mensuram consumabo, » is said to be a fragment from the *De utilitatibus astrolabii* of HERMANNUS CONTRACTUS. At Padua in MS Antoniana I, 27, of the 9th or 10th century, a « Horologium viatorum » occurs with the De computo of RABANUS and other anonymous astronomical treatises.

be a new version « according to moderns », worked out at Erfurt. (2)

It gives a figure of an upright cylinder with a conical top terminating in a knob by which it might be turned, with a vertical scale to the right of the cylinder and obliquely curving lines across the face of the cylinder which are to trace the sun's shadow. Apparently these instruments were used to determine the latitude as well as to find the hour and the altitude of the sun, or at least they were adapted to determine the hour in different places and latitudes where a traveler might be.

LYNN THORNDIKE.

---

(2) Vatic. Palat. lat. 134°, fols. 15v-17, « Incipio nunc modum compositionis chilindri bona *(sic)* valde et formaliter secundum modernos Erffordie correcta et exornata. »

Vatican Latin Manuscripts in the History of Science and Medicine.

This paper is the outcome of six weeks spent in the summer of 1927 in the Manuscript Study Room of the Vatican Library in the endeavor to obtain some idea of the materials there available in the Latin language, especially for the history of science. During the hot summer months in Rome the Vatican library is open only in the morning from eight to half past twelve, and some religious holidays also intervened, but I tried to avail myself to the full of every precious moment.

Besides the ordinary collection of Latin manuscripts which runs into five figures, the Vatican of course has other rich collections of Latin manuscripts which have been acquired at one time or another, such as those amassed by Queen CHRISTINA OF SWEDEN in the seventeenth century (shelf-marked Reg. Suev. etc.), or those which once belonged to the ill-starred Elector of the Palatinate (shelf-marked Palat. lat. etc.). There is the Barberini collection, of which the mere inventory fills twenty-three volumes, and the Ottobonian collection, to mention only those of most importance for our present purpose, although the Codices Rossianae also offer a few items of interest. So far as Latin manuscripts are concerned, only a small beginning has been made towards printing catalogues of these collections. The old catalogues in long-hand are accessible only at the Vatican and usually give very brief and insufficient descriptions of the codices and their contents. It is to be earnestly hoped that the recently announced gift of the Carnegie Corporation to the Vatican Library may be expended not primarily in introducing American library methods and cataloguing the printed books, most of which are probably accessible elsewhere, but rather in pushing on the publication of scientific catalogues of its manuscript collections which are so important, yet still to such an extent a closed book to scholars and researchers. Those parts of the collections where works on philosophy, nature,

medicine, mathematics, and the occult sciences congregate in the manuscripts, have seldom been reached in the printed catalogues thus far issued.

Since the Vatican library took form only near the close of the middle ages, its collections of manuscripts are rather more apt to be of value to one investigating the science and medicine of the fourteenth and fifteenth centuries than that of the twelfth and thirteenth. Its manuscripts of early medieval works are likely to be late copies and on this account inferior to codices available elsewhere. Indeed, in some cases its manuscripts of medieval works are as late as the seventeenth or eighteenth century and may even be copied from a printed edition. While the catalogues thus far printed by the Vatican library have included relatively few of its scientific manuscripts in Latin, others have been noted, described, or edited in various publications by individual scholars and investigators. As a rule it is my intention not to mention such manuscripts again, and to try to confine this survey to those which have not received previous attention. But no doubt some of these previous notices have escaped me. In general, too, those manuscripts of which notices are available in the catalogues already printed will not be included here. Thus Codices Vaticani Latini 1-678, 1401-2059, 9852-10700; Codices Urbinates Latini 1-1000; Codices Palatini Latini 1-921, are purposely omitted from present consideration.

Even so, this account will necessarily be very sketchy and incomplete, since there was time for only a rapid and superficial examination of the old written catalogues and of a very limited number of manuscripts. No doubt, too, a subjective element is not wholly absent from the process of selection. Works by well known authors, such as in medicine JAMES OF FORLI, GENTILE DA FOLIGNO, THOMAS and DINO DEL GARBO, MARSILIUS DE SANCTA SOPHIA, were usually passed over without troubling to ascertain whether these particular Vatican manuscripts of their works had been noted and utilized or not. On the other hand, it has sometimes seemed advisable to mention an early manuscript of an important work, although the work is available in print and the manuscript in question perhaps not entirely unknown. Works on logic will be omitted, as will be for the most part those on astrology, alchemy, and magic.

The reader's indulgence must further be craved for errors which undoubtedly will find their way into so hurried and fleeting a survey. The old catalogues in longhand have presumably failed to include some manuscripts, have omitted important items in others, and in other respects require revision and amplification. Often they give no date for a manuscript or ascribe it to too early a century. Sometimes I reproduce these conjectural datings as better than nothing; in a few cases I have found more exact evidence. But in most cases there was no time for such delicate matters as a determination of the date or provenance of a manuscript or its various component parts. These desiderata must await the scientific cataloguing of the manuscripts by trained palaeographers. The present aim is merely to give a glimpse, necessarily brief and imperfect, of some of the opportunities for an investigation of the history of science in the Latin manuscripts of the Vatican collections. The most convenient method of presentation seems to be a roughly alphabetical one by authors and subjects. Since medieval men usually did not have any last or family name, I have, with a few exceptions such as SACROBOSCO in place of JOHN HOLYWOOD, listed authors by their first or Christian names.

1) To ALBERTUS MAGNUS are ascribed in the catalogues some unfamiliar titles, but the items in question would probably turn out to be either excerpts from the known works of ALBERT or treatises incorrectly ascribed to him. « An Oil against all things which are contrary to human nature, » might possibly fall in the former category, though I should not know where to look for it in ALBERT's printed works. (1) To the latter category belongs a « Summa concerning the vices contracted in the study of theology, (2) » which is really by ROGER BACON. It is followed by

(1) Vatic. lat. 2482, fol. 166, ALBERTUS THEUTONICUS, *Oleum contra omnia contraria nature humane.* « ALBERT THE GERMAN » may be some other Albert than the Dominican of Cologne and bishop of Regensburg. In Vatic. 5377, fol. 137r, a treatise on waters is ascribed to ALBERTUS DE ALAMANNIA. Henceforth I shall omit the usual designation « lat. » from the shelf marks of manuscripts cited, since I commonly refer only to Latin codices.

(2) Vatic. 5004, fol. 1. For other MSS see the Bibliography of BACON's writings in *Roger Bacon Essays*, edited by A. G. LITTLE, 1914, p. 407, where reference is made to the discovery of the work by Drs. NOGARA and PELZER and the Rev. H. M. BANNISTER of the Vatican library.

a *Tractatus directionis*, (3) likewise ascribed to ALBERT in the old catalogue.

« A Treatise of questions on the forms appearing in mirrors, » which is ascribed to ALBERTUS PREDICATOR in a Vatican manuscript (4) and elsewhere, has already been listed as « ALBERTUS PRAEDICATOR, Katoptrik » by BJÖRNBO in the « Handschriftenbeschreibung » at the close of his study in collaboration with S. VOGL of *Alkindi, Tideus und Pseudo-Euklid*. (5) It seems not to have been printed.

2) A *Practica* of « BROTHER ALBERT THE COMMENTATOR, (6) » is probably one of the numerous works of alchemy attributed to ALBERTUS MAGNUS. Others occur in the Vatican collection, (7) including the *Semita recta* (8) which is so often and perhaps correctly represented as his. The manuscripts of the *Speculum astronomiae* at the Vatican (9) consistently support the attribution of that work to ALBERTUS MAGNUS and lend no countenance to the attempt of Father MANDONNET to foist it upon ROGER BACON. (10) The *Secrets of Albert* concerning the virtues of herbs, stones, and animals are ascribed to the Dominican of Cologne in one manuscript at the Vatican (11) and to ALBERT OF SAXONY in an-

---

(3) *Ibid.*, fol. 22, Eiusdem tractatus directionis, Incipit, « Accipe tabulam plenam... »

(4) Vatic. 2975, 16th century, fols. 151v-56v, « Incipit tractatus questionum ALBERTI predicatoris super formis in speculis apparentibus. Queritur de forma... / ... differentiam uisibilitatis. Et haec de rationibus speculorum sufficiant. Explicit tractatus ALBERTI predicatoris de rationibus speculorum. » I repeat this description from BJÖRNBO for the reader's possible convenience.

(5) *Abhandlungen zur Geschichte der mathematischen Wissenschaften*, XXVI, 3, 1912; see especially pp. 139, 141, 143.

(6) Vatic. 4425, fol. 277, Fratris ALBERTI comentatoris practica. Incipit, « Oculorum calida... »

(7) Vatic. 4091, fol. 42, opening, « Talentum mihi traditum... »; Palat. 1330, ALBERTI MAGNI de chemia.

(8) Vatic. 4092, fol. 1, opening, « Omnis sapientia... »

(9) Vatic. 4275, fols. 18-28, « Explicit libellus gloriosissimi viri domini ALBERTI quem edidit de libris astronomie. » Palat. 1340, fols. 75r-82v, « Incipit tractatus ALBERTI MAGNI de refutatione librorum nigromanticorum et approbatione librorum astronomicalium... / ... Explicit tractatus ALBERTI MAGNI de refutatione librorum astronomicalium. Sit laus deo. » Palat. 1445, ALBERTI MAGNI Astronomia.

(10) See my *History of Magic and Experimental Science*, 1923, vol. II, chapter 62; and P. MANDONNET, « ROGER BACON et le Speculum astronomiæ, » *Revue néo-scolastique*, vol. XVII, 1910, pp. 313-35.

(11) Palat. 1248, ALBERTI COLONIENSIS Ord. Praed. Secreta.

other (12). From a third codex one might receive the impression that a PAUL OF LIMOGES had compiled the *Secrets* from other writings of ALBERTUS MAGNUS, but a closer examination suggests that PAUL was responsible only for some extracts from ALBERT's works on natural philosophy which follow the *Secrets* in the manuscript in question. (13) A *De mirabilibus mundi*, found in a Vatican manuscript, does not seem to be the work of that title ascribed to ALBERT, since it has a different Incipit. (14)

3) Another treatise current under the name of ALBERTUS MAGNUS whose authenticity has been questioned is the *De secretis mulierum*. WICKERSHEIMER has recently shown that, whether by ALBERT or not, it certainly was not by HENRY OF SAXONY, for whom it had been claimed. (15) Of fifty-five manuscripts of the work listed by WICKERSHEIMER only one is from the Vatican, (16) but there is at least one other copy of it there, (17) while a third manuscript contains a commentary upon it which the catalogue ascribes to GENTILE DA FOLIGNO, the medical writer of the fourteenth century (18). The item in Vatic. 9018, fol. 76, which the

(12) Vatic. 4482, fol. 79, ALBERTI DE SAXONIA de virtutibus herbarum lapidum et animalium. But ALBERT OF SAXONY flourished in the middle of the fourteenth century and some manuscripts of the work appear to antedate this.

(13) Vatic. 4864, bound in boards. After a single leaf from an older, very regularly written, and legible codex of the same treatise, and a blank fly leaf, the text begins afresh with illuminated initials. An the close, fol. 10r, col. 2, occurs the Rubric, « Expliciunt secreta sceu experimenta fratris alberti in secretis eius super libros naturales compilata a magistro PAULO DE LIMOGIS. » But what PAUL appears to have done is to add other « secrets » and « experiments » from ALBERT's other works to the usual text of the *Secreta Alberti*. Thus the next line, also a Rubric, reads : « Frater ALBERTUS super libro de animalibus. » At fol. 13r, col. 1, « Hucusque albertus super libro de animalibus. Nunc albertus libro galieni de plantis. » At fol. 14v, col. 2, « Hucusque albertus super libro de plantis, nunc super libro de mineralibus ;» fol. 16r, col. 1, « Hucusque albertus super libro de mineralibus. Item ibidem super libro de anima »; and so on for the *De coelo et mundo*, *De proprietatibus elementorum*, and *Meteororum*.

(14) Reg. Suev. 1770, fol. 129, opening, « Cum natura... »

(15) ERNEST WICKERSHEIMER, « HENRI DE SAXE et le De secretis mulierum, Communication faite au 3e Congrès de l'histoire de l'art de guérir, Londres, 17-22 juillet, 1922; printed at Antwerp, 1923, 8 pp.

(16) Palat. 310, 14th century, fols. 144-148v.

(17) Palat. 1170.

(18) Vatic. 4456, fols. 1-30. I could see no mention of GENTILE in the treatise itself, but later in the same MS occurs an addition to the Anatomy of MUNDINUS which is sometimes ascribed to GENTILE, for instance, in a MS at Venice : S. Marco XIV, 43 (Valentinelli), fols. 92-93.

catalogue describes as « ARISTOTELIS Problemata seu secreta mulierum, » might turn out to be either the work ascribed to ALBERTUS MAGNUS, the *Secret of Secrets* of the PSEUDO-ARISTOTLE, or some third work. (19)

4) Of the *Mathematica* or *Astrologia* of ALHANDREUS or ALCHANDRUS, apparently one of the earliest works to be translated from Arabic into Latin, there is a manuscript at the Vatican (20), although it is centuries later than those of the British Museum and Bibliothèque Nationale already studied (21).

5) An anonymous Almanac of the planets from 1243 to 1303 A.D. is found in Vatic. 4572, a small parchment folio, while in another codex of the same collection (22) is discussed the science of making an almanac, that is, a table (*Tacuinum*) (23).

6) An unfamiliar discussion of the medical matter of critical days is found in a question by AMICUS OF SULMONA in 1397 whether the fourth day announces the seventh, and whether the eleventh forecasts the fourteenth. (24)

7) ANDALÒ DI NEGRO of Genoa, whom BOCCACCIO eulogized (25) both as his old teacher of astronomy and one who by extensive travel had acquired a wonderful knowledge of the world and *savoir faire*, and who had been ambassador for his city at the court of Trebizond, is represented in the Vatican manuscripts by both astronomical treatises and works of astrological medicine. (26)

---

(19) It is badly written in a fifteenth century hand and is bound up with two printed books.

(20) Vatic. 4084, fols. 1r-14v, ALHANDREI philosophi Saracenorum Astrologia, opening, « Igitur quoniam in hac arte utilissimum esse videtur... » This portion of the MS is membrane and in a hand not earlier than the thirteenth century. The rest of the MS is paper and written in a still later hand.

(21) Concerning them see my *History of Magic and Experimental Science*, I, 710-715. It has been questionned if BN 17868 is of the tenth century, but there can be no doubt that the Latin text goes back at least to the eleventh century. Palat. 1416, Alexandri Mathematica, is presumably the treatise which I mention at p. 714.

(22) Vatic. 3099, fol. 9, De scientia faciendi Almanach, idest Tacuinum.

(23) On the use of this Latinized Arabic word in titles of astronomical and medical works see my Query and the Answer of Dr. GEORGE SARTON, *Isis*, 10, 1928, pp. 489-93.

(24) Vatic. 2469, (JACOBI DE FORLIVIO questiones super Tegni GALENI).

Item AMICI DE SULMONA questio de diebus creticis vel utrum dies quarta annunciat septimam et undecima quartamdecimam disputata de anno 1397. »

(25) *De genealogia deorum*, XV, 6.

(26) Vatic. 4082, fols. 196r-209r, de iudiciis infirmitatum; fol. 209, de infusione

PIETRO BONO AVOGARO, doctor of arts and medicine and professor at the University of Ferrara, who emended the treatise on the astrolabe by ANDALÒ DI NEGRO in the printed edition of 1475 and had earlier edited the *Geography* of PTOLEMY, wrote treatises in both astronomy and astrology, some of which are found in Vatican manuscripts. (27)

8) In another manuscript are works on the stars and their motion and upon comets by an author whom I have failed thus far to identify, ANDREAS DE SOMMARIA. (28) In the former treatise he gives the current year as the 2136th of the era of NEBUCHADNEZZAR (29), which would correspond to 1389 A. D. This is confirmed by his dating PTOLEMY's astronomical observations in about the 880th year of the era of NEBUCHADNEZZAR. (30) He opens with the attention-arresting statement, « Whether the motion of the stars can be known I do not know, but that it is not yet known I most certainly hold. » (31) He is impressed by the weakness of human sense which is unable to make full use of astronomical instruments. (32) Indeed, on the fly leaf at the beginning of the whole manuscript the treatise of ANDREAS is given the title, « That astrology (or, astronomy) cannot be known. (33) » He appears, however, to be more skeptical as to our comprehension of the motion of the heavenly bodies than he is as to their astrological influence (34).

9) As an example of little known medical works comprised

---

spermatis. Vatic. 4085, 14th century, fol. 11, Canones iudiciorum infirmitatum; ol. 28r, de infusione spermatis; fol. 28v, de ratione partus. Vatic. 5906, de compositione astrolabii. See further my Query, « ANDALO DI NEGRO, PROFACIUS JUDAEUS, and the Alphonsine Tables, » *Isis*, 10, 1928, pp. 52-56.

(27) Vatic. 6253, liber computi de luna. Vatic. 5373, fol. 4, a brief astrologica tract, « Actum ferrarie die ultimo feb. anno a natali christiano 1475 per me PETRUM BONUM ADUOGHARIUM artium et medicine doctorem. »

(28) Vatic. 989, fols. 57r-69v, de stellis et motu earum; fols. 70r-81r, de cometis.

(29) *Ibid.*, fol. 65r, « a principio regni NABUCHODONOSOR ad diem istum qui est anni 2136 ipsius... »

(30) *Ibid.*, fol. 64r.

(31) *Ibid.*, fol. 57r, « Motus stellarum an sit scibilis nescio. quod ipse nondum sit scitus certissime teneo. »

(32) *Ibid.*, fol. 58r, « Postquam demonstratum est fore impossibile acquirere scientiam motus celi propter debilitatem sensus non valentis comprehendere habitudinem partium instrumenti. »

(33) The brief table of contents reads: «CLAUDIANUS de statu animae — ANDREAS DE SOMMARIA quod astrologia non possit sciri — Tractatus de cometa. »

(34) I have procured a photostat of his treatises for further study.

in the Vatican manuscripts may be mentioned a commentary on the first section of the *Aphorisms* of HIPPOCRATES, by ANGELUS DE PERGULA, doctor of arts and medicine, who was possibly of the same family as the later PAOLO DELLA PERGOLA or PAULUS PERGULENSIS, public lecturer on philosophy in Venice, who in 1448 refused a bishopric and died in 1451. The commentary of ANGELUS was copied or edited in 1397 by MELCHIOR JOHN OF GUBBIO. (35) The records of the University of Padua show that ANGELLUS DE LA PERGULA received his doctorate there after less than a year's residence. (36)

10) Among medieval manuscripts of Latin translations of the works of ARISTOTLE in natural philosophy Barberini 165, a thick codex of the thirteenth century, may be of some importance. (37) Most of the translations are anonymous. The manuscript opens with the fourteen books of the *Metaphysics* except that the first part of book one is gone. The older Latin translations included only its first twelve books. There follow the eight books of *Physics*, the *De coelo et mundo* translated from the Greek, *Generation and Corruption*, *Meteorology*, *De sensu et sensato*, *De memoria et reminiscentia*, *De somno et vigilia*, *De motu animalium* (but not the *De animalibus*), *De iuventute et senectute*, *De spiritu et respiratione*, *De morte et vita*, *De bona fortuna* (an excerpt from the *Ethics*), *De causis* with the commentary of PROCLUS. *De lineis indivisibilibus*, the supposititious *De pomo*, described as usual as translated from Arabic into Hebrew and then from Hebrew to Latin by MANFRED, son of FREDERICK II. Then come *De intelligentia*, *De vegetabilibus et plantis*, described as usual as translated from Greek into Arabic and thence into Latin, *De coloribus*, *De causis proprietatum elementorum* in part only, *De inundatione*, *De progressi animalium*, and *Physionomia*. There is also a medical extract, dated 1288, from the *Secret of Secrets* of the PSEUDO-ARISTOTLE to ALEXANDER. Sandwiched between the last of these items are the *De differentia spiritus et anime*, commonly ascribed

(35) Vatic. 9420, 14th century, 193 fols. Expositio super particula prima aphorismorum recollecta per MELCHIOREM IOANNEM DE EUGUBIO anno 1397 : « Dimissis que in primo librorum solent adduci... / ... die Sabathi. Deo gratias. Amen. »

(36) ANDREA GLORIA, *Monumenti della Università di Padova* (1318-1405), 1888, I, 454; II, 119.

(37) Barb. 165, membr., 415 fols.

to COSTA BEN LUCA, the work of SECUNDUS PHILOSOPHUS, Bishop MARTIN's *Formula vitae honestae*, and AVERROES *de substantia orbis*. They are followed by tracts or extracts ascribed to BOETHIUS, AQUINAS, and ALBERT, or without name of author (37).

11) Ottob. 2254 is a thirteenth century copy of WILLIAM OF MOERBEKE's translation of SIMPLICIUS's commentary on the *De coelo et mundo* which is not mentioned by GRABMANN who quoted the translator's statement at the end of the work from Balliol College Ms 99 of the fourteenth century. (38)

12) The Vatican appears to possess a thirteenth century copy of the *Colliget*, or chief medical work, of AVERROES in the Latin translation made by the Jew, BONACOSA, at Padua in 1255 (39).

13) On the first leaf of a Vatican manuscript, in very abbreviated writing, is a chapter on floods ascribed to AVICENNA. (40) Both he and AVERROES were cited on that theme by ALBERTUS MAGNUS and other medieval writers, especially anent the question of the possibility of generation after a universal deluge. In another manuscript, after better known works by AVICENNA, come a *Sermo* on the generation of stones, another on the generation of mountains, and a third on the generation of mineral bodies (41). The opening words of the first *Sermo* are those of the *De congelatione et conglutinatione lapidum*, (42) of which E. J. HOLMYARD and

---

(37) *Ibid.*, fol. 402v, BOETII de fluxu maris, BOETII de iride, BOETII de duratione mundi, BOETII de unitate; fol. 405v, de fractionibus vulgaribus; fols. 406v, de figuris geomancie; fol. 407, de signis tempestatum; fol. 407v, de mixtione elementorum; fol. 408, THOME DE ALBINO de motu cordis (probably it is really the work of ALFRED OF ENGLAND); fol. 408v, THOME DE AQUINO de essentia; fols. 411v-414v, ALBERTI de impressionibus factis in aere. GRABMANN, *Forschungen über die lateinischen Aristoteles-Uebersetzungen des XIII Jahrhunderts*, 1916, alludes to this manuscript but only for the *De pomo*.

(38) GRABMANN, *op. cit.*, pp. 148-9.

(39) Vatic. 9412, 13th century (according to the catalogue), 86 fols., Mehemeth AVERROIS de medicina libri septem : « Quando ventilata fuit... / ... deo gratias. Amen. »

(40) Vatic. 4426, fol. 1r-v, AVICENNE capitulum de diluviis.

(41) Vatic. 4428, fol. 114, Sermo de generatione lapidum, opening, « Terra pura non fit... »; de generatione montium, opening, « Montes vero quandoque... » ; fol. 125, de generatione corporum mineralium, opening, « Corpora mineralium... »

(42) Another Vatican manuscript of it, Vatic. 9941, 15th century, fol. 72, has already been noted in the printed catalogue covering numbers 9852-10300, VATTASSO e CERUSI, *Codices Vaticani Latini*, Vol. IV, Rome, 1914.

D. C. MANDEVILLE have recently printed both the Latin and Arabic text with an English translation (43)

14) Of the treatise of BARNABAS DE RIATINIS of Reggio on foods, completed at Venice in November, 1338, to which I called attention in 1926 (44) on the basis of a manuscript (45) at the Laurentian library in Florence, there is another manuscript at the Vatican. (46).

15) A *De proprietatibus rerum* in Barberini 473 (XI,116), 15th century, 236 double-columned fols., is represented by the long-hand catalogue of that collection as unpublished and by RABANUS MAURUS. An examination of its text shows that it the work of the thirteenth-century writer, BARTHOLOMAEUS ANGLICUS, which has been more than once printed. The Barberini manuscript is written in several hands, some of which are very neat.

16) A number of the works of BARTOLAMMEO DE MONTAGNANA have been printed, but so far as one can judge from their titles, the *De abortu*, which appears in Palat. 1316, is not among them. BARTOLAMMEO DE MONTAGNANA, professor of medicine at Padua, received the doctorate in 1403 (47), from which date on to 1450 his name appears constantly in the university records. (48)

17) JOHN JAMES BARTOLOTTI of Parma is a name for which I have looked elsewhere in vain. But in Vatic. 5376 are contained dated works by him. The first, *Opusculum antiquitatis medicine*, dedicated to NICCOLÒ MARIA D'ESTE, bishop of Adria, which office he held from 1487 to 1507, is a sketch of the history or antiquity of medicine delivered at the beginning of BARTOLOTTI's extraordinary lectures on AVICENNA at the University of Ferrara in 1498 (49). The sketch does not come down beyond ancient

(43) *Avicennae De congelatione et conglutinatione lapidum, being sections of the Kitab al-Shifa*, Paris, 1927. (*Isis*, 11, 134) The Latin text had of course been printed before in old collections.

(44) « Another Treatise by BARNABAS DE RIATINIS of Reggio, » *Isis*, 8, 285-6.

(45) Gaddi reliq. 209.

(46) Vatic. 3714, fols. 1-67r, « Incipit Compendium de naturis et proprietatibus alimentorum per magistrum BARNABAM aggregatam (?) Venerabili patri GUIDONI CONCORDIENSI episcopo directum... »

(47) A. GLORIA, *Monumenti* (1318-1405), 1888, I 441.

(48) ZONTA e BROTTO, *Acta graduum*, 1922, where his name occupies a solid column of figures in the index.

(49) Vatic. 5376, fols. 1-18v, opening, « Antiquorum principum, reverendissime presul... » Its main divisions as indicated by headings scattered through the text may be reproduced to give an idea of how the history of medicine was then

medicine, and may probably be regarded as called forth by the interest in classical antiquity of the humanistic movement. The next work in the manuscript on the nature of demons was compiled by BARTOLOTTI from the Platonists on December 13, 1498 and also at the University of Ferrara (50). The other treatise by him which occurs later in the manuscript is a medical *Tractatus complexionum* (51), dated 1520 and described as « published for himself and his posterity (52). »

18) The work of BENEDICT OF NURSIA or BENEDICTUS REGUARDATUS or BENEDETTO DI REGUARDATI on the preservation of health appeared several times in incunabula editions, of which the *princeps* at Rome was addressed to SIXTUS IV by the printer. But of two manuscripts of the work at the Vatican one is addressed to ASTORGIUS AGNESI, archbishop of Benevento from 1436 to 1451, and governor of the March of Ancona at the time of BENEDETTO's writing (53) — as is another manuscript of it which I

---

envisaged: fol. 2r, Medicina ex divinatione et vaticiniis; fol. 2v, Medicina ex cognitione herbarum simpliciumque medicaminum; fol. 3r, Medicina experimento habita; fol. 3v, Medicina a casu, Medicina ex insomniis; fol. 4v, De medicina ex magia; fol. 5r, Medicina ex astrologia et immaginibus; fol. 5v, Medice facultatis variis munctores (?) ex doctissimorum hominum auctoritate; fol. 6r, Indorum medicina; fol. 6v, Aegyptiorum medicina; fol. 8r, De AESCYLAPIO et graecorum medicina; fol. 9r, Cur AESCYLAPIO medicine inventum in APOLLINEM retulit; fol. 9v, Redargutio opinionis negantis medicos fuisse a bello Troiano usque ad Peloponesicum; fol. 10r, De PYTHAGORA DEMOCRITO EMPEDOCLE et aliis quibusdam gloriosissimis medicis; fol. 12r, De medicine artis inconstantia ac varietate et eius sectis; fol. 12v, De logica sive rationali heresi et chirurgia; fol. 13v, Qui maxime in rationali medicina medici claruerunt ex veteribus; fol. 14r, De ARISTOTELE peripatetico; fol. 15v, De GALENO pergamensi; fol. 16r, Qui ex recentioribus in hac maxime heresi emicuerint; fol. 16v, Empirica heresis; fol. 17r, Methodica secta; fol. 18r, Epilogus totius opusculi. »

(50) *Ibid.*, fol. 20r, Eiusdem IOANNIS IACOBI BARTHOLOTI parmensis tractatus de natura demonum 1498 13 decembris in ferrariensi gymnasio compilatus ex platonicis. I think that it includes what the catalogue of manuscripts lists separately as « Eiusdem excerpta ex libro PSELLI de demonibus, » at fol. 23, and probably also the « Differentia inter veneficium et magiam » at fols. 24v-25r. In general the manuscript is written in detached paragraphs with considerable space intervening, as if a first draft or assorted jottings.

(51) Its leaves are renumbered 2-29, or would be 61-88 of the whole manuscript. It opens, « Complexio est qualit... »

(52) Tractatus complexionum IOANNIS IACOBI Parmensis quem sibi ipsi posterisque suis aedidit. »

(53) Barberini 279, fols. 1r-87r, Ad Reverendissimum in Christo patrem et dominum dominum ASTERGIUM AGNENSEM beneventanum archiepiscopum Marchie Anchonitane Gubernatorem BENEDICTUS REGUARDATUS NURSINUS phisicus de

have seen at Florence (54); while the other is dedicated to Pope NICHOLAS V himself (55). From what I have seen of the treatise in the manuscripts — I have not had access to the incunabula editions of it — it is eminently sensible and well expressed for its period and deserves critical republication. It in part represents the author's own experience. Among other things he warns against the danger of coal gas from fires indoors at night which he says has caused several deaths. REGUARDATI was an important personage in his day. He taught at Perugia as early as 1426, and in 1438 was one of the two envoys appointed to plead with FRANCESCO SFORZA for clemency to Norcia. Later, when he was banished from his native town, he took refuge with SFORZA whose physician he became. When SFORZA became duke of Milan, he was in high favor, appearing in the documents of the University of Pavia (56) in 1447 as one of SFORZA's two *locum tenentes*, while his name heads the list of commissioners to reform the university, and he alone by general consent is exempted from the rule that no person not a citizen should be Prior or *Numerarius* of the College of Arts and Medicine. At this time he did little teaching, for while in a provisional *rotulus* of the faculty for 1448-1449 his name is down to lecture at will(57) for the handsome stipend of 600 ducats, a comment is added which leads us to infer that he was unlikely actually to deliver any lectures (58). Despite the fact that MARINI over a century since in his work on papal physicians(59) maintained that REGUARDATI was not one, NEUBURGER in his recent history of medicine (60) has represented him as physician

---

conservanda sanitate. « Summo cum studio decet emergentes morborum insidias deprimi... »

(54) Cod. Biscioniani 25, 15th century, fols. 1-18, De sanitatis conservatione ad reverendissimum in Christo Patrem et precolendissimum Dominum D. ASTORGIUM AGNENSEM Neapolitanum *(sic)* Anconitane Marchie Gubernatorem.

(55) Vatic. 6266, fols. 11-73v, « Pulcherrimum et utilissimum opus ad sanitatis conservationem editum ab eximio artium et medicine professore Magistro BENEDICTO DE NURSIA tunc serenissimi et potentissimi ducis Mediolani medico Ad s. in Christo patrem et d. n. D. N. divina providentia S. Pon. Incipit foeliciter. »

(56) See the *Codice diplomatico dell'università di Pavia*, published by the Società pavese di storia patria, Pavia, 1913, II, i, pp. 507, 512-13, 516, 540.

(57) *Ibid.*, p. 540, « Ad lecturam beneplaciti ».

(58) *Idem*, « M. Benedictus, si staret cum lectura, esset utilior ceteris. Sed quia non stat, faciat Dominus ut vult de sallario. »

(59) G. MARINI, *Degli archiatri pontifici*, Rome, 1784.

(60) Vol. II, p. 443.

to SIXTUS IV. This may be a mistaken inference from the Roman printer's dedication of the *De conservanda sanitate* to that pontiff. REGUARDATI is also known for his treatise on the pest.

19) BENVENUTUS or BENEVENUTUS GRAPHAEUS or GRASSUS of Jerusalem wrote on the eyes and their diseases and cure in the twelfth century. His work was printed in incunabula editions and has received considerable recent attention (61), including new editions from manuscripts (62). The two Vatican manuscripts of BENVENUTO's work have not been utilized in these new editions but they have been briefly described by ALBERTOTTI in his account of the manuscripts and editions of the work. The reason I refer to them again is that ALBERTOTTI has somehow confused the descriptions of the two Vatican codices (63). Thus Vatic. 5373 is not of the sixteenth century, does not contain BENVENUTO's treatise at fols. 29]-63r, and does not describe it as « The new art of BENEVENUTUS of Jerusalem concerning diseases of the eyes, translated from the Hebrew tongue into Latin. » All these points apply rather to Reg. Suev. 373. In Vatic. 5373 the treatise occurs at fols. 166v-181v and is said at the close to have been copied by ANGELUS CARDINALIUS, a philosopher and medical man, on April 3, 1475 at Perugia — all which features ALBERTOTTI incorrectly predicates of the other manuscript. He likewise transposes their opening and closing words.

20) Palat. 1380 is catalogued as « BERNARDI DE VERDUNO de celis. » Probably it is the same as his *Tractatus super totam astrologiam* of which there is a brief account in the *Histoire littéraire de la France* (vol. 21, pp. 317-320) based on two Paris manuscripts (BN 7333 and 7334). This informs us that the work is strictly

(61) G. ALBERTOTTI, « L'opera oftalmojatrica di BENVENUTO nei codici, negli incunabuli, e nelle edizioni moderne, » *Memorie della Regia Accademia di scienze, lettere ed arti in Modena*, Serie II, Vol. XII, 1896, Memorie della sezione di lettere, pp. 27-101. CHAS LABORDE, *Bienvenu de Jérusalem et son œuvre. Le ms. 176 de Metz, reproduction diplomatique*, Montpellier thesis, 1901, 76 pp. See also P. PANSIER, *Janus*, 9, 1904, pp. 6-9.

(62) Besides the reproduction of the Metz MS by LABORDE, just mentioned, A. M. BERGER and T. M. AURACHER, *Benvenutus Graphaeus Practica oculorum*, 1884-1886, edited the work from two Munich MSS (CLM 259 and 331), and from a Breslau and Basel MSS., while ALBERTOTTI, « I codici Riccard.ano, Parigino ed Ashburnhamiano dell'opera oftalmojatrica di BENVENUTO, » in the aforesaid *Memorie* of the Modena Academy, Serie III, Vol. I, 1898, Sezione di lettere, pp. 3-88 reproduced the texts of those three manuscripts.

3) See his aforesaid article of 1896, p. 33.

astronomical in character and contains no judicial astrology. It has ten parts. In one Erfurt manuscript it is called *Liber super totam astronomiam cum tabulis* (64), and in another *Speculum celeste* (65). BERNARD OF VERDUN was a Franciscan professor who wrote about 1300., one of the manuscripts of his work being written in the early fourteenth century.

21) Cardinal BESSARION, who died in 1472, figures as the principal speaker in an anonymous dialogue « De scientia Dei, de rerum contingentia, et de predestinatione, » in a fifteenth-century manuscript (66), where it follows two works of SCOTUS. It is not included in the edition of BESSARION's works in MIGNE's *Patrologia Graeca* and apparently is not noted in the modern works on BESSARION of VAST, MOHLER, and ROCHOLL.

22) The Vatican contains a number of manuscripts of works in the fields of physics and astronomy by BLASIUS, or BIAGIO PELACANI, of Parma who taught at Pavia, Bologna and Padua from at least 1377 to 1411, dying in 1416. But they have long since been noted by AFFÒ in his literary history of Parma (67), although what he describes as Barberini 732 appears now to be numbered 357.

23) JEAN BODIN's *Colloquium heptaplomeres de rerum sublimium arcanis abditis*, a discussion of matters of religion by representatives of seven different persuasions, was regarded as bordering so closely upon heresy, infidelity, and atheism that it was not printed until the nineteenth century. (68) CHRISTINA OF SWEDEN had difficulty in procuring a copy for her library, (69) and it is probable

(64) Amplon. Folio 393, fols. 22-43.

(65) Amplon. Folio 386, about 1359 A. D., fols. 1-25 : despite the variant title, its Incipit, « Quia ex scienciis fructu dignioribus... », shows it to be the same treatise as is found in the other manuscripts.

(66) Vatic. 9402, opens, « Paulus apostolus...; » closes, « ... naturali potentie attribuit. »

(67) IRENEO AFFO, *Memorie degli Scrittori e Letterati Parmigiani*, 1789, II, 119-125; also the continuation by PEZZANA, VI (1827), iii, 133. A fuller and more precise account of BLASIUS's career may now be made out from the university records of Bologna, Pavia, and Padua than is given by AFFO or, more recently, by DUHEM, *Système du monde*, IV, 278. I have attempted to do this in an article, « Blasius of Parma, » in *Archeion*, 9, 1928, 177-190.

(68) I have examined it in the Latin edition of 1857. A French edition was published in 1914 by ROGER CHAUVIRÉ.

(69) DAN .GEO. MORHOF, *Polyhistor*, 1732, Vol. I, p. 71.

that Reg. Suev. 1313 (70) is the manuscript which was finally obtained for her.

24) A *Quadripartitus of moral figures* by a Dominican named BONJOHANNES OF MESSINA to his nephew PRINCIVALLUS (71) seems to be a moralizing work on nature like the *Septiformis de moralitatibus rerum nature*, since it opens with a citation of the *Problems* of ARISTOTLE and is found in the same manuscript with an anonymous medical work called the *Portior medicinarum* or *Liber experimentorum* (72). QUETIF and ECHARD give our Dominican's name as BONJOANNES DE MESTANA and the title of the work as *Volumen quadripartitum per fabulas figurarum moralium*. The year 1343 has been suggested as his date, but it is not clear on what grounds (73). Presumably he is not to be identified with TOMMASO BONGIOVANNI of Sicily, also mentioned by QUETIF and ECHARD, MONGITORE, and MAZZUCHELLI — who died about 1350 but was born at Palermo.

25) Charms, conjurations, and superstitious prayers are found scattered through the Vatican collections as they are in other collections of medieval manuscripts (74).

26) The work of CHRISTOPHER DE (or, A) BONDELMONTIBUS, a Florentine priest and traveler, on the islands of the Cyclades to the Cardinal JORDANES in the early fifteenth century was not unknown earlier, but was first published as a whole (75) in 1824

(70) If the catalogue may be trusted, it gives the title in a slightly different word order from the 1857 edition : « Colloquium Heptaplomeres de abditis rerum sublimium arcanis. »

(71) Vatic. 4462, fols. 65r-91v, « Incipit quadripartitus figurarum moralium quas scripsit frater BONJOHANNES MESSANE ordinis predicatorum princivallo nepoti suo. »

(72) *Ibid.*, fols. 33r-54v, « Explicit liber experimentorum qui dicitur fortior *(sic)* medicinarum. » By « Portior » is presumably meant « portitor, » since on the first illuminated page of the treatise is a picture of a man with a book in his hands and a panier on his back.

(73) QUETIF et ECHARD, *Scriptores Ordinis Praedicatorum*, Paris, 1719, p. 616b, « F. BONJOANNES DE MESTANA laudatur a Lusitano p. 17, qui nec nationem nec aetatem addit. Excipiunt GOZZEUS, PIUS, FERNANDEZ et tandem ALTAMURA ad 1343, qui tamen nullam ampliorem ex veteribus monumentis lucem afferunt. Itaque penes eos fides. »

(74) The following will serve as examples of what I mean : Vatic. 4476, fol. 88, Varia ad tempestatem; Vatic. 4864, fol. 59, Oratio ad pestem verissima, « Aga + Ada + Ala + ».

(75) Its description of Constantinople had previously been excerpted and printed.

by G. R. L. DE SINNER from manuscripts of the Bibliothèque Nationale, then the royal library, at Paris. I have not been able to examine this edition, but it presumably makes no use of a manuscript of the work at the Vatican. (76)

27) Comets, and particularly that of 1472, receive considerable attention in manuscripts at the Vatican. Ottob. 874, 2484, and 2493 deal with comets. In Vatic. 7806A, fol. 39 there is an anonymous treatise on comets, followed at fol. 48 by a discussion of that which appeared in 1472. In Palat. 1438 is a Judgment by NICOLAUS HARTMAN of the significance of the comet of 1472. We have already spoken of the treatise on comets by ANDREAS DE SOMMARIA; those of MATTHAEUS DE AQUILA and of WILLIAM BECCHIUS will be mentioned later.

28) Manuscripts of works by CONSTANTINUS AFRICANUS (c. 1015-1087) are numerous both in the Vatican and Palatine collections.

29) Vatic. 3165 is a manuscript of the work of Cardinal GASPAR CONTARINI, *De elementis eorumque mixtionibus*, which was published posthumously at Paris in 1548.

30) Manuscripts of the treatise by COSTA BEN LUCA (QUSṬÂ IBN LÛQÂ AL-BA 'LABAKKÎ) *On the Difference between Soul and Spirit* in the Latin translation by JOHN OF SPAIN are so numerous that it is hardly worth while to call attention to Vatican 4426, where it is followed by the pseudo-Augustinian *De spiritu et anima*, (77) or to Barberini 165 where it is ascribed to ARISTOTLE.

31) Vatic. 5321 contains treatises on counterpoint by PROSDOCIMO DE BELDOMANDIS, PHILIPPUS DE VITRIACO, and JEAN DE MURS. All three of these treatises have been printed in E. DE COUSSEMAKER's *Scriptores de musica medii aevi*, 1863-1876, 4 vols. But he seems not to have used this manuscript, since he mentions no Vatican manuscript for the works on counterpoint of PHILIP

(76) Barberini 270, 15th century paper, 51 fols. Liber archipelagi insularum... quem misit de civitate Rhodi Romam domino IORDANO Cardinali de Ursinis anno domini M C"" XXX". This date appears to indicate 1432, whereas NEGRI and FABRICIUS assigned 1422 as the date of the treatise. Another manuscript of it in Spain is Escorial f. II. 17, 15th century, 176 fols.

(77) Vatic. 4426, fol. 37, CONSTABEN LUCE Phisicus de differentia que est inter spiritum et animam IOANNE HISPALENSE ex Arabico in Latinum interprete, « Interrogasti de differentia... »; fol. 41, Augustinus de spiritu et anima.

and JEAN, though he refers to one, without giving a shelf mark, for that of PROSDOCIMO.

32) In Palat. 1340, fols. 15v-17, occurs one of the manuscript versions of « the cylinder called the horologe of travelers, » of which I am treating more fully in a separate note.

33) In a manuscript of the Ottobonian collection a « *Philosophy* of Master JOHN DATUS on all the sciences, combining the knowledge of all in common », is sandwiched between two arguments or *sophismata* of HENRY OF GHENT (78). JOHN DATUS's work appears to be too brief to be of much consequence, and is probably more philosophical than scientific, since his other writings, mentioned by GANDOLFO (79) and FABRICIUS (80), are concerned with ARISTOTLE and logic, AUGUSTINE and theology. Whether JOHN DATUS died in 1360 or 1460 has been disputed, and also whether he was bishop or even bishop-elect of Imola.

34) What are catalogued as distinct astronomical treatises by DOMINICUS DE ARETIO in a Vatican manuscript (81) would probably on further examination turn out to be sections of the encyclopedic work, *De mundi fabrica* or *Fons memorabilium universi* of DOMINICUS BANDINUS OF AREZZO, a friend of PETRARCH, who lived on to complete his work about 1415 (82). It has not been printed and appears in the manuscripts chiefly in the form of fragments and extracts.

35) In another Vatican manuscript is a commentary on the *De coelo et mundo* by DOMINICUS DE CLAVISIO (83). He is apparently the same person as the DOMINICUS DE CLAVISIO, CLAVASIO, or

(78) In Ottobon. 2520, a collection of a number of old manuscripts on parchment bound between or mounted on paper, the work of JOHN DATUS extends from fols. 253r-258v, « Explicit philosophia magistri IOHANNIS DACI super omnes scientias et tradens cognitionem omnium in communi. »

(79) D. A. GANDOLFO, *Dissertatio historica de ducentis celeberrimis augustinianis scriptoribus*, Rome, 1704, pp. 210-211.

(80) *Bibl. mediae et infimae Latinitatis*, citing JOSEPHUS PAMPHILUS in Chronicis ordinis fratrum Eremitarum S. Augustini.

(81) Vatic. 3121, fol. 1, de celo, signis, et imaginibus celestibus, opening, « Iuvat me diu versatum... »; fol. 23, de stellis errantibus, opening, « Quoniam celos... »

(82) For an account of BANDINUS see L. MEHUS, *Vita di Ambrogio Traversari* which forms the preface to PETRUS CANNETUS's edition of TRAVERSARI's Letters : I, 1759, pp. cxxix-cxxxi.

(83) Vatic. 2185, DOMINICI DE CLAVISIO questiones de coelo et mundo, opening, « Circa lib. ce coelo... »

CLAVAGIO in five manuscripts of the Stadtbibliothek at Erfurt (84), four of which contain his *Practice of Geometry*, while the fifth includes a question by him on the *Sphere*, presumably of SACROBOSCO. Since all these Erfurt manuscripts are of the fourteenth century and include one copy of his geometry made at Prag in 1368, he must have written somewhat before that date. One manuscript describes the geometry as composed by him at Paris; another speaks of him vaguely as « the astrologer of one of the kings of France. » He is not mentioned by such historians of mathematics as CANTOR and DAVID EUGENE SMITH, nor in the published records of such universities as Bologna and Padua, nor by FABRICIUS. But CHEVALIER, without, however, noting any of the aforesaid manuscripts or his interest in geometry and astronomy, identifies him with a DOMINIQUE DE CHIVASSO or DOMENICO DI CIVASSO — Clavasium being the Latin form for Chivasso near Turin — whom TIRABOSCHI, following DU BOULAY, described as a member of the College of Constantinople at Paris and a popular professor of philosophy there in 1349 (84) — an unlikely date for large classes, following directly as it does after the year of the Black Death. I might add that the College of Constantinople has usually been represented as without students in the fourteenth century (86).

36) Of some of the books of experiments or experimental books, which were discussed in my *History of Magic and Experimental Science* (87), there are further manuscripts in the Vatican collections. The experiments of JOHN PAULINUS with the powdered skin of a snake, entitled *Salus vitae*, occur in at least three codices (88). The « Experiments of a Chancellor » occur in a Palatine manuscript, but in this instance the Chancellor is neither called GILBERT nor expressly associated with Montpellier (89). There are several

(84) See the descriptions of Amplon. Folio 37, 393 and 395; Quarto 299 and 352 in WM. SCHUM, *Beschreibendes Verzeichniss der Amplonianischen Handschriften-Sammlung zu Erfurt*, Berlin, 1887.

(85) BULAEUS, *Historia universitatis parisiensis*, 1608, Vol. IV, p. 954. TIRABOSCHI, *Storia della letteratura italiana*, 1807, Vol. V, i, 236; 1823, V, i, 355.

(86) See C. JOURDAIN, « Un collège oriental à Paris au XIII^e^ siècle, » in his *Excursions historiques*, 1888.

(87) Vol. II, chaps. 43, 63, 64, 65.

(88) Vatic. 4476, fol. 52; Vatic. 4864, fol. 17; and apparently Vatic. 4425, ol. 138.

(89) Palat. 1199, fols. 1r-6v, Incipiunt experimenta cancellarii. Some of the

copies both of the *Medical Experiments* attributed to GALEN which open, « Dixit GALENUS, Ignis qui... » (90), and of those, commonly called *Secrets of Galen* which begin, « Rogasti me amice... » and are addressed to MONTEUS (91). In Palat. 1328 « GALENI liber secretorum super elixir solis et lune », seems a different treatise, presumably alchemical (92). From the meager description in the catalogue one would infer that Reg. Suev. 1129 (93) contained the *Secrets* or *Aphorisms* of RASIS (ABU BAKR MUHAMMAD IBN ZAKARIYA AL-RAZI), but an examination of the text itself might show it to be some other of these books of experiments or secrets. Unspecified medical secrets are contained in manuscripts Vatic. 7273, 7274, and 7275, while in Palat. 1268, 1272 and 1273 are *Experimenta diversorum*. In Vatic. 4462, besides the *Portior medicinarum*, already mentioned, at fol. 33, there is « another book of experiments » at fol. 55 (94). Experiments of a MASTER TADEUS occur in a medical manuscript, so that probably THADDEUS OF FLORENCE (1223-1303) is the author meant (95). Medical experiments of BENJAMIN THE JEW are found in Palat. 1211. In Palat. 1394 a are « Experiments of Invisibility, » that is, how to become invisible, while Vatic. 4425 contains both medical conjurations and experiments. Thus the collections of « Experiments » in the Vatican manuscripts bear out that mixture of medicine, chemistry, and magic which we observe in similar collections elsewhere.

37) JACOBUS FABER Stapulensis, or JACQUES LEFÈVRE d'Etaples, is generally given prominent mention in histories of the Reforma-

---

topics treated are : De capillis; fol. 2v, Ad tumorem oculorum que subito fit in oculis; fol. 3v, Contra dolorem aurium; fol. 4r, Ad dentes mortuos; fol. 5r, Syrupus conferens pstisicis et consumtis.

(90) Vatic. 2416, fol. 62; 2418, fol. 84; 2385, fol. 266; 4437, fol. 26.

(91) Vatic. 2375; 2385; 4422, fol. 9, where they are anonymous but identifiable by the Incipit; Barberini 166, 14th century, fols. 42v-47v. The catalogue's description of Palat. 1205, « Gallieni Secreta, » is insufficient to indicate whether it is the work addressed to Monteus.

(92) On the subject of works of alchemy ascribed to GALEN in the middle ages see my *History of Magic*, etc. II, 783-4.

(93) Reg. Suev. 1129, fol. 67, AVEU BUBACHAR MAHUMETIS filii liber secretorum.

(64) It opens : « Recipe vitellum unius ovi... » (Take the yolk of an egg).

(95) Vatic. 4422, fols. 58-84, « Omnes herbe et radices... » G. PINTO, *Taddeo da Firenze o la medicina in Bologna nel XIII secolo*, 1888, has discussed works of THADDEUS contained in Vatic. 2418, but I do not recall his mentioning Vatic. 4422 and no longer have access to his monograph.

tion, of French humanism, and of the Christian Renaissance, but that he wrote a work on natural magic in six books is seldom, if ever, remarked. Such a treatise is ascribed to him, however, in a Vatican manuscript (96). It must be confessed that, despite its title, it has more to do with magic than with nature or science and so scarcely comes within the scope of our present survey.

38) FERNANDUS OF CORDOVA was a boy marvel who came out of the Spanish peninsula like young LOCHINVAR from the west in the fifth decade of the fifteenth century, ready like PICO DELLA MIRANDOLA later to dispute with all comers (97). The Vatican contains two treatises by him, one on the art of knowing everything, and involving scientific classification, addressed to Cardinal BESSARION (98), the other on diagnosis from urine (99).

39) The treatise of FIRMINUS DE BELLAVALLE on weather prediction, written in 1320 and already known in the printed editions of 1485 and 1539 and in a Paris manuscript (BN 7482), is found in a Vatican manuscript with the title, *De impressionibus aeris* rather than *De mutacione aeris*, while the authors' name is spelled FIRMINIUS (1).

(40) Vatic. 2463 is a handsome, illuminated manuscript, written in double columns with large margins, of medical works of GALVANUS DE LEVANTO of Genoa, who was physician to Pope BENEDICT XII and became a priest in 1338. He modestly refers to himself as the « shadow of a physician » (*umbra medici*), and appears to have remained somewhat in the shade so far as historians and bibliographers are concerned. FABRICIUS and JÖCHER allude

(96) Reg. Suev. 1115, fols. 1-96r, IACOBI FABRI Stapulensis de magia naturali ad clarissimum virum germanum ganaum regium gubernatorem libri sex. I find that RENAUDET, *Préréforme et humanisme à Paris* (1494-1517), 1916, pp. 151-3, has given some account of the work and Latin quotations from it. Another manuscript of it is Brussels 10875.

(97) See BONILLA Y SAN MARTIN, *Fernando de Cordova* (1425-1486?) *y los origenes del renacimiento filosofico en Espana*, 1911.

(98) Vatic. 3177, De artificio investigandi et inveniendi natura scibiles ad BESSARION Cardinalem, 62 fols. Incipit, « Quos vides inter scholasticos et praestanti ingenio viros... »

(99) Reg. Suv. 1773, fols. 49r-61r, De secretis humane dispositionis per urinam dignoscendis ad nobillissimum virum GUIDONEM BARBUTI.

(1) Palat. 1340, fols. 209v, col. 1-242r, col. 1, « Incipit prologus in FIRMINIUM de impressionibus aeris. Quia in multis voluminibus sapientes antiqui de mutationibus aeris... / ... infinita prestigia apparebunt ho. in eodem libro de prestigiis usque ad finem. Explicit FIRMINIUS de impressionibus aeris. »

only to ascetic writings by GALVANUS preserved in the Bibliothèque Nationale, Paris, and say nothing of our Vatican manuscript or the medical works which it contains. Possibly they are mentioned by MARINI (2), to whose work I do not at present have access. In the Vatican manuscript we find first a long work on the stomach and indigestion in three parts, of which the second has ninety-nine chapters, (3) then a cure for catarrh, (4) next a cure for diseases of the joints (5), and finally a brief tract of spiritual medicine (6). GALVANUS is indeed devout in tone throughout the manuscript but that does not debar it from being of some medical and historical importance.

41) The Vatican has several manuscripts of medical works by ANTONIO GUAINERI, or ANTONIUS DE GUAYNERIIS, professor of medicine at Pavia where he is mentioned in faculty lists of 1412-1413 and 1448 (7). NEUBURGER Vol. II (1925) p. 128 therefore is somewhat inaccurate in placing his death about 1445. His pest tractate is fairly well known and is said to occur in Vatic. lat. 2482, but I have no note to that effect. Palat. 1194 has medical works by him; Palat. 1221 contains his treatise on fevers; Palat. 1214 includes his pest tractate and also a work on intestinal complaints (8), in five sections devoted respectively to diarrhoea, *lyenteria*, colic, dysentery, and *tenasmon*. Vatic. 3163 gives his work on diseases of women which is dedicated to PHILIP MARIA. duke of Milan, and therefore was written before 1447 (9). But

(2) G. L. MARINI, *Degli archiatri pontifici*, 1784, I, 60-64; is the citation for GALVANUS which I take from CHEVALIER.

(3) Vatic. 2463, fol. 1r, In nomine domini nostri iehsu christi Amen. Thesaurus corporalis prelatorum ecclesie dei et magnatum fidelium GALVANI IANUENSIS DE LEVANTO umbre medici contra nocumentum digestionis stomaci rubrica. « Quantumcumque scientia medicine quis polleat... »

(4) *Ibid.*, fol. 69r, Remedium salutare contra catarum GALVANI IANUENSIS etc. It has a preface and twelve chapters.

(5) *Ibid.*, fol. 78v, In nomine summi medici Iesu Christi amen. Incipit primus liber Paleofilon curationis langoris articulorum multiplicis dolorosi GALVANI JANUENSIS DE LEVANTO umbre medici ad ven. arch. ramen. dominum ALBERTUM de flisco, opening, « Proficiscor quempiam non delectat nisi amor invitet... »

(6) *Ibid.*, fols. 110-114v.

(7) See the *Codice diplomatico*, II, 123, 534-535, 538-539.

(8) Palat. 1214, fols. 71r-117r, ANTHONII GUAYNERII papiensis de fluxibus ventris tractatus incipit, « Volens de intestinorum egr[illegible]udinibus doctrinam ponere... / ... Et in hoc ani egressionis cura finitur. Laus de[illegible]. »

9) Vatic. 3163, fol. 1r, Rubric, « Incipit tractatus de egritudinibus propriis mulierum ad magnanimum principem PHILIPPUM MARIE anglum mediolani ducem

his work on poisons in Vatic. 8759 is also addressed to FILIPPO MARIA, yet bears at the close the date 1451, which may be that of copying it (10). A briefer version of this treatise on poisons is found in Palat. 1214, where it forms the second part of a treatise to FILIPPO MARIA on the pest and poisons (11). Indeed in the longer version of Vatic. 8759 it also is described as the second part of a treatise, but the first part on the pest is not included in that manuscript. There are at least two incunabula editions of GUAYNERIUS's work on pest and poisons (12), but I do not know how they relate to the two versions of the manuscript text.

42) Of the *De habitudine causarum et influxu nature superioris* (13) *respectu inferiorum* of HENRY OF HESSE, the fourteenth century schoolman, in which he discusses the fundamental hypothesis of astrology, there is a rather poorly written and illegible copy in Vatic. 3088, opening at fol. 14, « Quia libenter scire... » This and his *De reductione effectuum spiritualium* (14) *in causas communes* formerly occurred in Vatic. 9369, a codex of the fourteenth century, but are now missing. Other treatises apparently ascribed to HENRY are still found in this manuscript : — *De discretione spirituum, De speculo anime, Utrum secundum naturalem philosophiam sint alique substantie separate preter motores orbium, Questio de*

---

et papie anglerieque comitem ac Ianue dominum. » Opens, « Nichil est, princeps magnanime, ut rem statim agrediar... » At fols. 3r-4v is a table of contents of the 37 chapters. The treatise ends at fol. 80v.

(10) Vatic. 8759, fols. 11-94v, « Incipit secunda pars principalis huius tractatus materiam continens venenosum cuius in initio tabula ponitur capitulorum. » The table of contents extends to fol. 4v. An fol. 94v we read : « Explicit secunda pars principalis huius tractatus que est de venenis et sic finitur totus tractatus tam scilicet de peste quam de veneno. Ad illustrissimum principem dominum dominum FILIPUM MARIAM anglum Mediolani ducem et cetera Papie anglerieque comitem atque Janue dominum. Editum per ANTONIUM DE GAYNERIIS de Papia inter artium et medicine doctores minimum et cetera. Deo nostro iocunda sit laudatio. Millessimo quadracesimo quinquagesimo primo decimo die Mensis decembris. »

(11) Palat. 1214, fols. 5r-70r, rubric, « ANTONII GUAYNERII papiensis ad s. d. d. PHILIPPUM MARIAM anglum vicecomitem mediolani ducem etc. papie anglerieque comitem ac ianue dominum de peste ac venenis tractatus incipit. » Opens : « Ad te, principum et ducum illustrissime, cuius immortalitas non minus diis quam hominibus grata est... » The second part on poisons begins with a table of contents at fol. 47r.

(12) Hain 8097 and 8101. The dated edition is that of Pavia, 1481.

(13) The word *communis* sometimes appears instead in the title.

(14) In other manuscripts of the work this word is either entirely omitted or some such reading as *particularium* or *specialium et mirandorum* takes its place.

substantia demonum, and *Tractatus de astronomia* (or, *De spera*). But except for the last these deal with the realm of spirits rather than of nature.

43) The HENRY OF MALINES, to whom a treatise on critical days is ascribed in Palat. 1211 (15), is presumably the same as HENRY BATE of Malines, known for his astronomical and other writings (16) and translations.

(44) Hermetic books are not absent from the Vatican collections. *De speculis et luce* (Of mirrors and light) was hitherto known to me only from a citation in Cecco D'ASCOLI's early fourteenth-century commentary on ALCABITIUS, but an Ottobonian manuscript contains « Flowers of Hermes extracted from the book *De speculis et luce* (17) ». Despite the title, the contents are entirely astrological. A few leaves further on in the same codex is a *Sermo hermetis de accidentibus rescriptus ab Haly* (18). The more familiar treatise on fifteen stars, fifteen stones, fifteen herbs, and fifteen images, ascribed now to HERMES, now to ENOCH, is found in two Vatican manuscripts as by HERMES (19). The Palatine collection has the treatise of HERMES on images of the planets (20), another treatise on constellations (21), and « Secrets of JAMES according to HERMES. (22) » The two last named are perhaps something new and require further examination which I did not have time to give; I cite them merely from the catalogue.

45) Two manuscripts of the *Hieroglyphics* of HORAPOLLO in

---

(15) Palat. 1211, 15th century, fols. 89-100, « Explicit tractatus de diebus criticis a magistro HEINRICO compilatus, dicto de Malinis. Requiescat in pace. » This manuscript has already been mentioned by J. A. F. ORBAAN, *Bescheiden in Italie omtrent Nederlandische Kunstenaars en Geleerden*, Eerste Deel, « Rome. Vaticaansche Bibliothek, » 's Gravenhage, 1911, page 111, No. 137.

(16) Of these his *Speculum divinorum et quorundam naturalium* is found in Vatic. 2191, fols. 6-336v, from which ORBAAN, *op. cit.*, pp. 12-13, has printed the dedicatory preface to the bishop of Utrecht. This had already been published by MAURICE DE WULF, « HENRI BATE de Malines, » *Bulletin de l'Académie royale de Belgique, Classe des lettres*, 1909, pp. 465-81, but I believe from another manuscript at Brussels.

(17) Ottob. 1552, fols. 83r-87v, Hermeti Flores extracti de libro de speculis et luce.

(18) *Ibid.*, fols. 99v-101v.

(19) Vatic. 5733, fol. 187, Hermes de quindecim stellis etc.; Vatic. 4087, fol. 84, with additions by Arnald of Villanova.

(20) Palat. 1375.

(21) Palat. 1354.

(22) Palat. 1335, IACOBI secreta secundum HERMETEM.

Latin translation which exist at the Vatican might be of some service in tracing the origin and textual history of that work which deals also with the marvelous habits and properties of animals, supposed to have been translated into Greek by a PHILIP from the Egyptian. But one, at least, of the Vatican copies is of the seventeenth century (23).

46) A Barberini manuscript contains an astrological discussion of critical days by the Dominican, HUGO DE CIVITATE CASTELLIS(24). QUETIF and ECHARD were aware only of his commentary on the *Sphere* of SACROBOSCO, begun at Paris and completed at Florence in 1337, of which a copy was preserved at the time when they wrote in the Dominican convent of St. Honorarius at Paris. HUGO was otherwise unknown to them. (25) But our manuscript calls him bishop as well as friar and states that his treatise on critical days was written at Perugia in 1358, thus considerably extending our knowledge of his date and career. I fail to find his name, however, in lists of medieval bishops or in literary histories of Perugia such as that of VERMIGLIOLI.

47) In a sixteenth-century manuscript is a work on medicinal herbs of the Indies which « an Indian physician of the College of Holy Cross composed, taught by no reasons but by experience only, » in the year 1552. (26) There is a dedication by MARTIN DE LA CRUZ to FRANCISCO DE MENDOZA, and the work closes with a letter of JOHN BADIANUS, the Latin translator, to the reader.

48) The Latin translation of a work on plants ascribed to GALEN is attributed in Vatic. 4422 to JACOBUS ALBENSIS, (27) a

---

(23) Vatic. 3898, HORI APOLLINIS Hieroglyphica, « Seculum signere... »; Vatic. 6887, 17th century, fols. 1-24, HORI APOLLONIS Niliaci Hieroglyphica quae in lingua aegyptia edidit ipse, in graecam vero PHILIPPUS vertit, « Aevum vel aeternitatem... »

(24) Barb. 178, 14th century membr., fols. 105-6, « Incipit tractatus de diebus criticis secundum astrologos editus Perusii anno Christi 1358 per venerabilem virum dominum fratrem HUGONEM DE CIVITATE CASTELLIS ord. praed. et episcopum mire in astrologia peritum. » « Sicut dicit commentator... / ... et vocatur similitudo. »

(25) QUETIF et ECHARD. *Scriptores ordinis praedicatorum*, 1719, Vol. I, p. 593b.

(26) Barb. 241, paper, 63 fols., Libellus de medicinalibus Indorum herbis quem quidam Indus Collegii Sanctae Crucis medicus composuit, nullis rationibus doctus sed solis experimentis edoctus anno Domini Servatoris 1552.

(27) Vatic. 4422, fols. 1-6, GALENUS de plantis IACOBO ALBENSI interprete, « Prima earum inquit GALENUS... » In Vatic. 4864 we saw ALBERTUS MAGNUS represented as commenting on GALEN on plants.

personage otherwise unknown to me and whom I have not seen mentioned elsewhere as a translator into Latin. He does not appear to be identifiable with the JACOBUS ALEXANDRINUS or the JACOBUS HENRICUS de Alba listed by FABRICIUS. The common medieval work on plants was usually ascribed to ARISTOTLE rather than to GALEN. It was a brief treatise, really by NICOLAUS DAMASCENUS, which ALFRED OF ENGLAND or SARSHEL translated from Arabic into Latin in two short books and which ALBERTUS MAGNUS expanded into the seven long books of his *De vegetabilibus et plantis*. STEINSCHNEIDER, however, identified the *De plantis* ascribed to GALEN with a *De medicinis occultis* which was translated from the Arabic by ABRAHAM TORTUOSIENSIS and GRUMERUS, a judge of Piacenza. (28) The work was included in some of the earlier editions of GALEN's works and was described by KÜHN (29) as a synopsis of the books of GALEN *De simplicium medicamentorum facultatibus* made by some Arabic physician and enriched by the commentaries of HUNAIN IBN ISHAK. (30)

49) Vatic. 5698 contains the Latin translation of PTOLEMY's *Geography* by JACOBUS ANGELUS who in 1393 returned with CHRYSOLORAS from Italy to Constantinople in order to learn Greek and search for manuscripts. In 1409 he translated the *Geography* for Pope ALEXANDER V. Can the Vatican manuscript be the autograph?

50) In 1505 a « Question of the subtle doctor, JOHN DE CASALI, on the velocity of the motion of alreration (31), » was printed at Venice with the *De modalibus Bassani Politi* etc. The same brief work is found in a Vatican manuscript (32) and in a Riccardian manuscript at Florence which dates it of 1346. JOHN DE CASALI was a doctor of theology and native of Montferrat. In 1375 GREGORY XI made him his nuncio to FREDERICK, king of Sicily.

51) A copy of the *Liber secretarius practice* of master JOHN

(28) « Die europäischen Uebersetzungen aus dem Arabischen, «Vienna *Sitzungsberichte, Philos.-Hist. Klasse*, Vol. 149, 1905, pp. 2, 32.

(29) *Claudii Galeni Opera Omnia*, I, clxxi.

(30) For some further account of the work's content see my *History of Magic and Experimental Science*, Vol. II, pp. 763-4.

(31) Incipit, « Utrum in mobilibus ad qualitatem id semper velocius moveatur quod in equali tempore acquirit maiorem latitudinem qualitatis... » Explicit. « Ad hoc respondeo concedo conclusiones omnes istas tamquam possibiles. »

(32) Vatic. 3026, fols. 29-33.

JAMES, chancellor of the University of Montpellier, occurs in Palat. 1240, fols, 41r-73r (33). It deals in six books and numerous tractates with the diseases of various parts of the body. TIRAQUEAU in the long alphabetical list of medical men in the thirty-first chapter of his *De nobilitate* (Venice, 1574) seems to allude to this work as the *Thesaurarius* rather than *Secretarius* (34). JOHN JAMES is also known for his pest tract. BARBOT lists five manuscripts of it from other libraries (35) but fails to note two at the Vatican, Palat. 1210 and 1229, IOANNIS IACOBI de pestilentia. JOHN JAMES may well be the Chancellor whose *Experiments* have been already mentioned, but BARBOT notes no such work by him. He was physician to some of the popes at Avignon and wrote the *Liber secretarius* at the request of CHARLES V of France in 1370. His secret appointment as chancellor was contested by the faculty in 1364; he died in 1384 (36).

52) Vatic., 2225 fols. 11r-37v, is a manuscript of the *De proportione motuum in velocitate* of JOHN MARLIANUS of Milan (died 1483), the physicist and mathematican and professor of astrology and philosophy at Pavia. This manuscript was not known to ARGELLATI in his account of JOHN (37). The work was printed in 1482. MARLIANUS dedicates his work to BENEDICTUS REGUARDATUS, the physician of SFORZA, whom we have already mentioned. In another manuscript (38) is a pest tractate composed by a JOHN DE MERLIANO, doctor of arts and medicine, who was

(33) BARBOT, in his account of «Les œuvres de JEAN JAUME» in the work mentioned in a following note, gives the title as *Secretarium* and lists only two MSS of it, both from Paris, BN 6957 and 6988A, and both already noted by PANSIER, « Les maîtres de la faculté de médecine de Montpellier au moyen âge, » *Janus*, 9, 1904, pp. 600-2. PANSIER was scarcely correct in calling the work of JOHN JAMES « assez bref »; he seems to have misinterpreted the author's description of it as « unam summam brevem. » It is short for a *Summa* but not for a treatise.

(34) « IOANNES IACOBUS Montispessulani Cancellarius cuius Thesaurarium medicinae habemus in quo tractat de morbis particularibus. »

(35) ANDRÉ BARBOT, *Traité de la peste composé en* 1376 *par Jean Jaume*, Dissertation, Montpellier, 1923, 39 pp., Latin text with French translation.

(36) For further details of his life see BARBOT, *op. cit.*, pp. 9-12, or Pansier, *Janus*, 9, 1904, pp. 600-2.

(37) P. ARGELLATI, *Bibliotheca scriptorum Mediolanensium*, Milan, 1745, II, 866-868.

(38) Barberini 186, 15th century, fols. 49v-52. I have not examined the manuscript. From its closing note quoted presently in the text it might be inferred that this pest tract was an incunabulum bound into the manuscript, but from its foliation beginning at 49 *verso* one would infer not.

moved by the terror which the plague excited in Venice. It would hardly seem that he can be the same person as JOHN MARLIANUS. A note appended to the manuscript informs us that this pest tract was printed at Venice in 1478 and « now at Rome in 1482, » but the work is unnoted in KLEBS' bibliographical list of incunabula on the plague (39) and in other catalogues of incunabula.

(53) In 1397 JOHN MOLINERII wrote a work on weak sight, *De visus debilitate*, Reg. Suev. 1847, fols. 128r-135v. It is apparently addressed to a pope or cardinal (40) and is signed « your humble servant JOHN MOLINERII, physician to our lord the king, » — whether of France or not is not stated. The work does not seem to have been printed. In PANSIER's list of masters of the medical faculty of Montpellier in the fourteenth century (41) a GUILLELMUS MOLINERII appears in 1378 as a procurator, but no JOHN MOLINERII is mentioned.

54) In Vatic. 4422, which we have already noticed as containing two collections of medical experiments, there further occurs « a brief compilation or booklet of medicines, simple and compound. (42) » It is attributed to JOHN DE PALMA, which may possibly be a slip for Parma. AFFÒ long since listed manuscripts by JOHN OF PARMA at the Vatican and elsewhere (43), and there was a JOHN OF PARMA in medicine both at Bologna about 1300 and at Avignon at the time of the Black Death. But a JOANNES DE PALMA in medicine is unfamiliar. (44).

55) Of the following items ascribed vaguely to JORDANUS in the long-hand catalogue of the Palatine collection, the *De ponderibus* may be presumed to be the familiar work of JORDANUS NEMORARIUS but the catalogue's indications are too brief to pass on the others without examining the manuscripts themselves : Palat. 1173,

(39) A. C. KLEBS et E. DROZ, *Remèdes contre la peste : fac-similés, notes et liste bibliographique des incunables sur la peste*, Paris, 1925.

(40) It opens, « In nomine sancte crucis et summi pontificis a quo omnes cause producuntur... » and closes, « ... ad vestre paternitatis reverentiam... »

(41) *Janus*, 9, 1904, p. 596.

(42) Vatic. 4422, fols. 85-87, JOANNIS DE PALMA compilatio brevis seu libellus de medicinis simplicibus et compositis; opening, « Quoniam quidam... »

(43) Padre IRENEO AFFO, *Memorie degli scrittori e letterati Parmigiani*, 1789-1833 Vol. II, pp. 47-48. »

(44) Under that name CHEVALIER has merely a cross reference to JEAN DE BAUME, Dominican and Inquisitor from 1316 to 1333.

Experimenta; 1212, *Astronomica*; 1377, *De ponderibus*; 1380, *De coelis*. An arithmetic in three parts is ascribed to a JORDANUS DE DATIS in Ottob. 2120; that of JORDANUS NEMORARIUS has ten divisions. In Ottob. 309 JORDANUS NEMORARIUS is credited with two arithmetical works: at fol. 114, *tractatus duo de numeris et de minutiis*; at fol. 120, *elementa arithmetice*.

56) To JORDANES DI TURRE (GIORDANO DELLA TORRE?) is ascribed a work on finding the degrees of simple or compound medicines. It is addressed to his son JOHN (45). JORDAN appears to write at Montpellier, since he refers to ARNALD OF VILLANOVA and BERNARD GORDON as his predecessors and to his son's associates in that venerable *Studium*. The work is dated 1325 both in the top margin and the Explicit. PANSIER has noted from the Montpellier records that JORDANUS DE TURRE was professor in 1313, again appears in 1320, and is cited by GUY DE CHAULIAC and VALESCUS DE TARANTO writing later in the century (46). PANSIER thought that the mention in 1335 among the professors at Montpellier of a JOHANNES DE TURRE was a slip for JORDANUS, but would not this be the son JOHN of our manuscript to whose associates in the university his father refers? Of works by JORDANUS DE TURRE PANSIER mentioned two: in BN 7066, « de mulierum impregnatione »; and in the same library, nouveau fond latin 1391, « Tractatus mutilatus JORDANI DE TURRE in quo ponuntur remedia multarum egritudinum ». The Vatican manuscript would appear a different work from either of these.

57) The Vatican contains a copy which seems not hitherto to have been noted of the Algebra of AL-KHOWARIZMI in Latin translation (47). It is not ROBERT OF CHESTER's translation as edited by KARPINSKI (48) but rather the form of translation published by LIBRI from two Paris manuscripts (49). This version is probably

(45) Vatic. 2225, fols. 53r, col. 1, — 66v, col. 2: JORDANIS DI TURRE de adinventione graduum in medicinis simplicibus et compositis, opening, « Salvet te Deus, fili mi IOHANNES, in veritate te dirigat... »

(46) P. PANSIER, «Les maîtres de la faculté de médecine de Montpellier au moyen âge, » *Janus*, 10, 1905, 3.

(47) Vatic. 5733, fols. 275r-87r. The MS includes works of POMPONAZZI as well as thirteenth century authors, and so is presumably late.

(48) L. C. KARPINSKI, *Robert of Chester's Latin Translation of the Algebra of Al-Khowarizmi*, 1915.

(49) GUILLAUME LIBRI, *Histoire des sciences mathématiques en Italie*, Halle, 1865,

that by GERARD OF CREMONA, but in our Vatican manuscript SIMON OF CREMONA is said to have translated the work at Toledo from Arabic into Latin. BONCOMPAGNI published a still different version (50), which is represented as GERARD's translation, from another Vatican manuscript. (51)

58) In discussing the work of ROBERT KILWARDBY, archbishop of Canterbury from 1272 to 1279, on the origin and divisions of science or philosophy, BAUR mentioned one anonymous manuscript of it at the Vatican — Vatic. 5328 (52). There is yet another — Vatic. 9414, 15th century, fols. 1-64r.

59) Professor HASKINS has listed three Vatican manuscripts of the twelfth century translation from the Greek of the work usually known as KIRANIDES (53). He does not mention Vatic. 7610, but it is of the seventeenth century and doubtless hardly worth mentioning. One other manuscript professes to give the Harpocration of Alexandria from whom the Latin *Kiranides* is partially derived (54). Another is the Latin version, perhaps translated from the Arabic instead of the Greek, under the name

---

Vol. I, Note XII, pp. 263-97. Vatic. 5733 has the same Incipit, « Hic post laudem dei et ipsius exaltationem inquit : Postquam illud quod ad computationem esset necessarium consideravi repier totum illud numerum fore... » It closes at p. 286 of LIBRI's text, « ... est numerus hominum primorum qui sunt duo homines. » To this corresponds at p. 120 of KARPINSKI's text, « ... numerum puellarum priorum designabit, et ipsae sunt duae. »

(50) *Atti dell'Accademia Pontificia de'Nuovi Lincei*, Tomo IV, Anno IV (1850-1851), Roma, 1852, pp. 387-493, « Della vita e delle opere di GHERARDO CREMONESE, traduttore del secolo duodecimo, e di GHERARDO DA SABIONETTA astronomo del secolo decimoterzo. Notizie raccolte da BALDASSARE BONCOMPAGNI. » The text is printed at pp. 412-35.

(51) Vatic. 4606, fols.72r-76v, « Incipit liber qui secundum Arabes vocatur algebra et almucabala, et apud nos liber restauracionis nominatur, et fuit translatus a magistro GIURARDO CREMONENSE in toleto de arabico in latinum. Unitas est principium numeri et non est numerus... »

(52) LUDWIG BAUR, *Dominicus Gundissalinus de divisione philosophiae*, Münster, 1903, Vol. IV of *Beiträge zur Geschichte der Philosophie des Mittelalters*, Heft 2-3, pp. 368-75.

(53) C. H. HASKINS, *Studies in the History of Mediaeval Science*, 1924, p. 219, note 152. I think that the number of the Vatic. Palat. lat. MS is 1279 rather than 1273, as there stated.

(54) Palat. Graec. 226, 15th century, fol. 194, Ex Harpocratione Alexandrino de animalium plantarum et lapidam vitutibus physicis selecta ordine litterarum digesta. I have not seen the manuscript to make sure whether the text is in Greek or in Latin.

Alchiranus (55), of which I listed a Venetian manuscript in my *History of Magic and Experimental Science* (56). The Vatican manuscript is, like the Venetian, of the sixteenth century, and both may be late fabrications. The brief works of ALEXIUS AFRICANUS and TESELAUS on seven and twelve herbs respectively, which are apparently closely associated with the Kiranides, also occur in Vatican manuscripts (57).

60) Of the surgical work of LEONARD OF BERTIPAGLIA in the early fifteenth century, between whose manuscript and printed texts there are important divergences, which I discussed in 1926 on the basis of the two manuscripts of the treatise then known to me (58), there is a third manuscript at the Vatican (59).

61) In Vatic. 6867 *Astrologia Leonardi a Qualea* has the same Incipit, « Lux naturae deus... » as the *Astronomia medicinalis* of LEONARDUS QUALEA, concerning whom Dr. SARTON made inquiry in *Isis*, 6, 1924, pp. 523-4, and I replied in *Isis*, 8, 1926, pp. 336-8. The only manuscript previously mentioned of QUALEA's work was BN 10, 624 at Paris. Since the Vatican manuscript is of the seventeenth century, it is presumably of little value and may be merely a copy of this Parisian manuscript.

62) To MAGORINUS, whoever he may have been, a theory and practice of medicine, a work on artificial waters, and a rule of health are ascribed in as many manuscripts by the long-hand catalogue of the Palatine collection (60). He would hardly be the same as the MAGROBONUS whose geometry was translated into Italian by GIOVANNI DEI DONTI about 1370 (61).

---

(55) Vatic. 9952, fols. 131-232, Liber Alchiranni de proprietatibus rerum. Liber phisicalium virtutum compassionum et rationum... deinde de lapidibus exequemur, amen.

(56) Vol. II, p. 232 : citing S. Marco XIV, 37 (Valentinelli), fols. 11-73.

(57) Vatic. 6267, fol. 48, Tractatus de septem herbis planetarum, « ALEXIUS AFRI... »; Palat. 1234, ALEXII AFRICANI de septem herbis et septem planetis; Palat. 1278, TESELAI Philosophi Herbarium. In the last named manuscript we also have ALQUASIQUI de herbis.

(58) « The manuscript text of the *Cyrurgia* of LEONARD OF BERTIPAGLIA, » *Isis*, 8, 1926, pp. 264-84.

(59) Reg. Suev. 1969; and a fourth manuscript at Venice, S. Marco L.VII.LI (Valentinelli, XIV, 28). A fifth manuscript is Wolfenbüttel 4007.

(60) Palat. 1213, MAGORINI Theorica et practica medicinalis; 1229, de aquis artificialibus; 1332, de regimine sanitatis.

(61) STEINSCHNEIDER, «Die europäischen Uebersetzungen aus dem Arabischen,» Vienna *Sitzungsberichte, Philos.-Hist. Klasse*, Vol. 149, 1905, p. 40.

63) Of the *Liber ignium* of MARCUS GRECUS, important in the history of chemistry, which BERTHELOT edited from two Paris and two Munich manuscripts (62), there are at least two more manuscripts at the Vatican (63). In this connection may be mentioned an anonymous work on fire, its nature, action, and effects, in a third Vatican manuscript. (64)

64) Brother MATTHAEUS DE AQUILA. of the Order of Celestines and professor of theology, wrote under CALIXTUS III (1455-58) on the causes and nature of comet and earthquake. A copy of his treatise is preserved in a Barberini manuscript (65). The occasion of his work was no doubt the two destructive earthquakes in 1456 which also led JANNOTTI MANETTI to address three books on the subject to ALPHONSE OF ARAGON in 1458 which I have just been reading in a Paris manuscript, BN 6746.

65) The Vatican contains a manuscript of MICHAEL SCOT's *Abbreviatio Avicenne libri animalium*, of which HENRY OF COLOGNE was permitted by the emperor FREDERICK II to make this copy at Messina in 1232, (66) and another manuscript comprising MICHAEL's *Liber particularis* and *Liber physionomie* (67).

---

(62) BERTHELOT, *La chimie au moyen âge*, 1893, Vol. I, pp. 89-135. I mentioned some other MSS of it in my *History of Magic and Experimental Science*, 1923, Vol. II, p. 786.

(63) Vatic. 5377, fol. 127, MARCUS GRECUS, Liber ignium; Palat. 1176, MARCI GRECI de igne artificiali.

(64) Ottob. 1870, fols. 158r-65r. The title, which seems to have been written in by a later hand, reads, « De igne, ignisque natura, ac de multis que per ignem efficiuntur. » The treatise opens, « (S) tatuis et collossis faciundis quales fecere veteres ex ere... »

(65) Barb. 268, 15th century, 33 fols., De causis atque natura comete et terremotus, opening, « Sepe metum post illum tremendum et periculo plenum motum terre... » and closing, « ... presidentique universali ecclesie Sancto domino Nostro CALISTO TERTIO. »

(66) Barberini lat. 305, 13th century, membr., 49 fols, « FREDERICE, Romanorum imperator, domine mundi, suscipe devoto hunc laborem MICHAELIS SCOTI ut sit gratia capiti tuo et torques collo tuo. Ut animalium quidam... / ... iam scis ex alio loco. Completus est liber AVICENNE de animalibus scriptus per Magistrum HENRICUM COLONIENSEM ad exemplar magnifici in primis domini FREDERICI apud Messiam *(sic)* civitatem Apulie ubi dictus Imperator eidem magistro hunc librum promissum commodavit anno Domini MCCXXXII in vigilia beati Laurentii. »

(67) Rossi. 421 (formerly IX, 111 and 1182), fols. 1-48 Astrologie lib. II particularis; fols. 49-72, Liber physionomie. This MS is noted under its old number by HASKINS, *Studies in Medieval Science*, 1924, p. 291; he further cites *Neues Archiv*, Vol. XXX, p. 353 *et seq.*

66) IOANNES BAPTISTA MONTANUS, or GIOVANNI BATTISTA MONTANO, a physician of Verona, was a prolific medical commentator and author of the first part of the sixteenth century. His *De methodo medendi* was already during his lifetime coupled with that of GALEN by other writers (68). An Ottobonian manuscript contains a grouping of his treatises (69) which does not seem to correspond to any of the numerous editions of his works listed in the British Museum printed catalogue.

67) Although the huge medical compilation of NICCOLÒ FALCUCCI of Florence, who died in 1411 or 1412, is available in the printed edition of 1484 in several enormous volumes and in subsequent editions, it may be worth while noting that it is contained in four successive manuscripts of the Vatican (70). A *De febri pestilentiali ac de venenis* is attributed to NICCOLÒ FALCUCCI in Ottob. 3030, but I cannot say whether it is an extract from his aforesaid omnium gatherum, whose second *Sermo* is devoted to fevers but whose discussion of poisons I do not recall.

68) In Vatic. 3897, fols. 77r-86r is a very interesting discussion of the question whether Platonic ideas concur in the generation of natural things by NICCOLÒ DA FOLIGNO, in the form of a letter of 1470 to his *compater* NICCOLÒ, which I propose to compare with the similar work of NICCOLÒ DA FOLIGNO to LORENZO DE' MEDICI in a manuscript at Florence (71), and to print both texts in a forthcoming volume on *Science and Thought in the Fifteenth Century*.

69) In the Vatican are two unpublished works by NICOLAS ORESME which I believe to be identical with two described from manuscripts in the Bibliothèque Nationale at Paris by CHARLES JOURDAIN in his article on ORESME and the astrologers of the

---

(68) *J. Caii... de medendi methodo libri duo ex Cl. Galeni...* et J. B. M. *sententia*, 1544; J. CRATO, *Methodus Therapeutica ex sententia Galeni* et J. B. M., 1555.

(69) Ottobon. 1180, fol. 1, de componendis medicamentis; fol. 51, de investigatione simplicium medicamentorum; fol. 87, de medendi methodo; fol. 127, Consilium. This last item has possibly not been printed.

(70) Vatic. 2442, 2443, 2444, and 2445, Sermones septem de conservatione sanitatis. In the catalogue the author is referred to simply as NICOLAUS FLORENTINUS, which does not serve to distinguish him from NICCOLO NICCOLI, the friend of POGGIO.

(71) Laurent. Plut. 82, cod. 22. I have already treated of it somewhat in an article on « Some Unpublished Renaissance Moralists and Philosophers of the Second Half of the Fifteenth Century, » in *The Romanic Review*, XVIII (1927). 114-133.

court of CHARLES V (72), although in the Vatican manuscripts they have different titles. But the *Tractatus in quo redarguitur ars magica* (73) has the same Incipit (74) as the treatise described by JOURDAIN under the title, *Contra judiciarios astronomos*. A treatise by ORESME in Vatic. 4082, fols. 97v-108, is incorrectly catalogued as *De incommensurabilitate motuum coelestium* and as opening « Cum ZENONEM et CRISPUM... » An examination of the codex itself reveals that the work opens, « ZENOMEN et CRISPUM maiora egisse affirmat SENECA... » and that its author states in the preface, « hunc libellum edidi de commensurabilitate motuum celi. » (75) Presumably it is identical with ORESME, *De commensurabilitate motuum celestium* in a manuscript now at Florence (76) and with JOURDAIN's *De proportionalitate motuum coelestium*. I am now engaged in a more detailed study of the work.

70) Of the work on dreams, or *Liber thesauri occulti*, which I described on the basis of an anonymous manuscript at Paris (77) and which Professor HASKINS identified from a DIGBY manuscript at Oxford (78) as the work of PASCHAL THE ROMAN, produced at Constantinople in 1165 (79), there is yet another manuscript at the Vatican (80) but it is incomplete, like Harleian manuscript 4025 of the British Museum mentioned by HASKINS.

71) Several manuscripts at the Vatican attest the penchant of pope PAUL III (1534-1549) for astrology (81).

---

(72) In his *Excursions historiques et philosophiques à travers le moyen âge*, 1888 pp. 561-585.

(73) Vatic. 4275, fols. 35-40r.

(74) « Multi principes... », alluding to the devotion of many princes to astrology.

(75) However, its second book considers the possibility of their being incommensurable.

(76) Ashburnham 210 (old number 142), fols. 159r-171v.

(77) BN 16610, fols. 2r-24r : see my *History of Magic and Experimental Science*, II, 297-300.

(78) DIGBY 103, fols. 41-58v.

(79) C. H. HASKINS, *Studies in Medieval Science*, 1924, p. 218.

(80) Ottobon. 1870, fols. 97r-102r, Rubric, « Liber thesauri occulti a PASCHALI ROMANO editus Constantinopoli » but without giving the date. The Incipit is as printed by HASKINS from the DIGBY manuscript.

(81) Vatic. 3687, VINCENTII FRANCISCUCII ABSTEMII de laudibus astrologie ad PAULUM III, opening, « Magna diu questio... »; 3689, MARTII ALTERII genitura HORATII FARNESII CASTRI DUCIS ad PAULUM III; 3690, MARTII ALTERII de revolutione anni octogesimi primi etatis PAULI III; 3691, MARTII ALTERII genitura ALEXANDRI FARNESII OCTAVII DUCIS filii; 7180, fols. 366-375, Vaticinia IOANNIS DE ANGUILERA beatissimo pontifici PAULO III inscripta.

72) Since Vatic. 3684 appears to be the only known manuscrip of PAUL OF MIDDELBURG's (1445-1533) *Exhortatio pro calendarii emendatione ad Innocentium VIII*, written in 1491, it may be well to mention it, although it has already been included in the list of PAUL's writings given by D. J. STRUIK in his article, « De Geschriften van PAULUS VAN MIDDELBURG, » in the publications of the Dutch Historical Institute at Rome (82).

(73) The subject of Optics or Perspective, to which ROGER BACON devoted the fifth section of the *Opus maius*, is treated in a number of manuscripts, of which the further study might prove profitable. BACON's own treatment is found in Palat. 828, Vatic. 2975 and 3102, as Mr. A. G. LITTLE has already noted in his bibliography of BACON's writings. Another copy of it is found in Barberini 350, 14th century membrane, fols. 2-17, as the opening and closing words of the text make evident, although no author is named. In Barberini 357 is the Perspective of BLASIUS of PARMA, whose contents I have described elsewhere (83). The Incipit of an anonymous perspective in Vatic. 4082, fols. 11-21v, (84) « Inter phisice considerationis studia lux iocundius afficitur... » serves to identify it with the work of JOHN PECKHAM. Other anonymous treatises which on closer examination could perhaps be identified with works of known authorship are : Vatic. 3102, fol. 55, « In planis speculis... »; Vatic. 5963; Palat. 1369, Prospectiva et signa coelestia; Ottob. 1850, fol. 8, Anon. de speculis comburendis.

74) Vatican manuscripts were not used by SUDHOFF in his series of nineteen articles in the *Archiv für Geschichte der Medizin* on pest tractates written during the century and a half following the Black Death (85). There are, however, at the Vatican both

(82) *Mededeelingen van het Nederlandsch Historisch Instituut te Rome*, Vol. V, 1925, pp. 79-118. Also described by ORBAAN, *Bescheiden in Italie*, 1911, p. 18, No. 28. ORBAAN, *Ibid.*, 198-9, describes PAUL's *De correctione kalendarii*, addressed to LEO X, as found in Ottob. 370.

(83) *Archeion*, Vol. IX, 1928, pp. 187-8.

(84) I have examined the text which has fairly frequent headings in larger writing scattered through it. The text terminates, « ... auctor libri de speculis non intellexit credo quod erravit. Si quem vero prolixior delectet demonstratio, sextum consideret perspective. »

(85) KARL SUDHOFF, « Pestschriften aus den ersten 150 Jahren nach der Epidemie des « schwarzen Todes » 1348, » The concluding article, in the volume of the *Archiv* for 1925, pp. 241-91, gives indices of authors, titles, Incipits, and manuscripts.

a number of manuscripts containing treatises which he lists from other sources, and also some treatises which he does not mention. Of these I am treating in a separate note to the *Archiv für Geschichte der Medizin*.

75) A goodly number of manuscripts at the Vatican contain works by PETER OF ABANO, the celebrated writer on medicine, astronomy, and philosophy of the late thirteenth and early fourteenth centuries, but most of these have already been listed by SANTE FERRARI in a supplement to his earlier study on PETER (86). He seems, however, to have overlooked the manuscripts of the Barberini collection, where we find a copy of PETER's *Physionomia* (87), of his treatise on the motion of the eight sphere (88), of his work on poisons (89), and of his completion of the translation of the fourteenth book of GALEN's *Therapeutic Method*, left unfinished by BURGUNDIO OF PISA (90).

76) Since we have mentioned PETER's work on poisons, it may be noted that the catalogue gives no author for a treatise on poisons in Vatic. 6863, but dates the codex as of the fifteenth century. We have already referred to the work on poisons of ANTONIO GUAINERI and shall later mention that of WILLIAM DE MARRA.

---

(86) SANTE FERRARI, « Per la biografia e per gli scritti di PIETRO d'ABANO, » *Atti della R. Accademia dei Lincei*, Anno CCCXII, 1915, Serie quinta, *Memorie della classe di scienze morali, storiche e filologiche*, Vol. XV, Rome, 1915, pp. 629-727. While 1915 is the date on the title page of the volume, FERRARI's preface is dated December, 1917, and the separate cover for his particular fascicule, Fasc. vii, is dated 1918 It was perhaps not actually printed even then, because of wartime conditions, and seems to have been received at the Columbia University library only an Dec. 15, 1922, although some earlier fascicules in the same volume, dated 1915 and 1916, were received on March 19, 1918.

(87) Barb. 341 (X, 159), 15th century, 26 fols. « Incipit liber compilationis physionomie a Magistro PETRO DE PADUA in civitate Parisiensi, cuius tres sunt particule... / ... hoc bonum optimum quoque creavit. »

(88) Barb. 256, 15th century chart., fols. 103-14v, « Quoniam iuxta PTHOLOMEUM... / ... et diversitas inde causata existent. »

(89) Barb. 332, 14th century, fols. 326-37. It is unusual in that the pope to whom it is addressed is called INNOCENT : « Reverendissimo in Christo Patre et domino Innocentio divina Providentia summo Pontifice... » However, at Venice an Italian translation of the work in MS S. Marco XI, 82 (Valentinelli), is also addressed to INNOCENT.

(90) Barb. 178, 14th century membr., fols. 3-44v, «Expletus est liber tarapeutice cum additionibus Magistri PETRI DE EBANO que deficiunt ex translatione BURGUNDIONIS civis Pisani. Deo gratias anno domini MCCCXXVIIII die VIa Maii. »

77) JOHN HOLYWOOD or SACROBOSCO, of whose life we know little at first hand, has been known chiefly through his astronomical and mathematical works of an elementary character, an *Algorismus*, an ecclesiastical *Compotus*, and the much used *Sphere*. There is also said to be a treatise on the astrolabe by him in a manuscript at the Bodleian, but I cannot give its shelf mark. But the catalogue of the Ottobonian collection at the Vatican represents more advanced works as attributed to him in its manuscripts : commentaries on ARISTOTLE's four books *De coelo* (91) and on his *De generatione et corruptione* (92), and a third work on measuring altitudes, latitudes and depths by various instruments and mathematical practices. (93) I did not have time to inspect the manuscripts in question to determine how far they supported these attributions.

78) SANCTA SOPHIA was the name of a famous family of physicians, professors or medicine, and medical writers in Italy of the later middle ages. Some of the works of GALEAZZO OF SANCTA SOPHIA, who died of the plague in 1427, have been printed, but not, so far as I can find, the *Simplicia Galeatii*, contained in a Vatican manuscript of 1462 A. D. (94)

79) In Vatic. lat. 2225, a manuscript which we have had occasion to mention in other connections in this article, the opening treatise is by a SIMON GEMINIUS of Perugia on quantitative virtue. SIMON writes from his house in Perugia on April 16, 1470, and addresses a prologue to NICCOLÒ OF TIVOLI (95).

80) This same manuscript contains treatises by SIGISMUNDUS DE POLCASTRIS (96) which were printed at Venice in 1506 (97), but one of them gives the date of its composition in 1444, the *Questio de actuatione medicinarum ad Laurentium Roverellum*.

(91) In both Ottobon. 3024 and 3290.

(92) Also contained in both the above mentioned manuscripts.

(93) Ottobon. 3290, de modo mensurandi altitudines latitudines profunditates per varia instrumenta et praxes mathematicas.

(94) Vatic. 1279, fols. 1-120.

(95) Vatic. 2225, fols. 11-8v, SIMONIS GEMINII de Perusia Tractatus de virtute quantitativa. The prologue opens : « Sepe ac multum... » The text begins, « An quantitas... » The whole ends, « ... Bene vale NICOLAE sapi. dulcissime. Perusie ex nostris domibus 16 kalendas maias 1470. »

(96) The *Questio de extremis temperantiae* occupies fols. 109-115r; the *Questio de actuatione medicinarum* occupies fols. 146-176r. Other medical tracts by him intervene.

(97) HAIN *13291 notes a 1473 edition of his *Quaestio de restauratione humidi*.

This is confirmed by another manuscript of the same treatise at Venice (1), while a Bologna manuscript instructs us that MICHAEL SAVONAROLA in or before 1455 addressed his *Opus practicum* to SIGISMUND while the latter was lecturing on theory (2). This SIGISMUND lived to be ninety-four, taught over half a century at Padua (3), and, when all four of his sons died, remarried at seventy and had three more, of whom, says FABRICIUS, he lived to « adorn the second with the laurel in philosophy with hands tremulous from age. »

81) NIKOLAOS SOPHIANOS figures in LEGRAND's *Bibliographie hellénique* and KRUMBACHER's *Byzantinische Literaturgeschichte* as a Greek humanist of the first half of the sixteenth century and author of the first grammar of vulgar Greek. But in Vatic. 3686 is a Latin translation of a treatise by him on the astrolabe. As translator from the Greek is named ARNALDUS AIMERIUS (4).

82) Three medical works by STEPHANUS ARLANDI are found in as many Palatine manuscripts : 1225, *Experimenta*; 1331, *Dietarium*; 1234, *Viridarium super Antidotarium Nicolai*. The records of Montpellier mention a Master STEPHANUS ARLANDI as vice-chancellor in 1319. PANSIER regarded this as a slip of the pen for STEPHANUS ARNALDI, an author often cited by GUY DE CHAULIAC and VALESCUS DE TARANTA. GUY states that he treated JOHN XXII for eye trouble. MARINI further identified him with an ARNALDUS DE CATUSSIO of the diocese of Cahors who received a fee of forty

(1) S. Marco XI, 17 (Valentinelli), 15th century, fols. 57-81, « Expleta et formata est questio de actuatione medicinarum... ad contemplationem dilectissimi LAURENTII ROVERELLA per SIGISMUNDUM DE POLCASTRIS patavum in studio paduano currente anno Domini 1444. »

(2) Bologna A. 125, a 1455, 440 fols., with fols. 437-440 left blank, « Clarissimi domini MICHAELIS SAVONAROLE Patavinii equitis Hierosolimitani phisici sua tempestate excellentissimi ad d. SIGISMUNDUM POLCASTRUM patav(in)um theoricam legentem a capite usque ad pedes opus practicum feliciter incipit. Grave onus non minusque laboriosum... / ... et claudicant si non errantur. Explicit... et sic est finis ingeniosissimi operis... scripti et completi per me DANIELEM VERSAREN residentem in alma Universitate Studii ferrariensis anno domini 1455 die 28 may hora 16. »

(3) His name appears with great frequency in the academic records from 1412 to 1450, which is as far as they have been published : consult the Index of ZONTA et BROTTO, *Acta graduum academicorum gymnasii Patavini ab anno MCCCVI ad annum MCCCCL, Patavii*, 1922.

(4) Vatic. 3686, NICOLAI SOPHIANI de astrolabio ARNALDO AIMERIO interprete, opening, « Cum multis sane... »

florins from BENEDICT XII in 1340. PANSIER listed the titles of some seven works by STEPHANUS (5), but only one of our three treatises at the Vatican is among them, namely, the *Viridarium*. STEINSCHNEIDER, however, noted manuscripts of the *Dietarium* and of a translation by STEPHANUS of the *De sphaera solida* of COSTA BEN LUCA but did not mention our Palatine codices. Nor did he give STEPHEN's date but placed him as from Barcelona (6). Both STEINSCHNEIDER and CHEVALIER agree with PANSIER in regarding STEPHANUS ARNALDI as the more correct form of the name than ARLANDI, but I doubt it in view of the concurrent testimony of our Palatine manuscripts and the Montpellier records. Moreover, in a Wolfenbüttel manuscript the Latin translation of *De sphaera solida* is ascribed to STEPHANUS ARLANDI (7). In any case, none of the works to which we have referred appear to have been printed (8). The *Experimenta* may be the same as those of the Chancellor of Montpellier, since ARLANDI was vice-chancellor.

83) Two Vatican codices (9) may be added to the list of manuscripts of the *De natura rerum* of THOMAS OF CANTIMPRÉ in my *History of Magic and Experimental Science*, Vol. II, pp. 396-8.

84) Of JOHN TOLHOPF and his work on the movements of the heavens in two books addressed to Pope SIXTUS IV I have failed to find any mention, edition, or manuscript other than that at the Vatican (10). It includes astronomical tables, at the foot of each of which is a calculation for Rome, 1475. This was the year in which SIXTUS IV recalled REGIOMONTANUS to

(5) PANSIER, « Les maîtres de la faculté de médecine de Montpellier au moyen âge, » *Janus*, 10, 1905, pp. 9-10.

(6) STEINSCHNEIDER treated of him in *Serapeum*, Vol. XXI, 1870, p. 292; and in Vienna *Sitzungsberichte* etc. Vol. 149, 1905, pp. 77-8.

(7) Wolfenbüttel 2816, anno 1461, fols. 116-21, Practica sphere solide translata a STEPHANO ARLANDI in latinum 1301. According to STEINSCHNEIDER the manuscripts usually give 1303 as the date of translation.

(8) CHEVALIER's reference to COPINGER, 1902, II, ii, 645, is erroneous, and there is nothing by STEPHANUS ARLANDI or ETIENNE ARNAUD in the printed catalogues of the British Museum and Bibliothèque Nationale.

(9) Vatic. 822, where it is the fourth treatise in the MS; Vatic. 10064, 15th century, fols. 161-263.

(10) Vatic. 3103, fols. 1r-32r, Ad sanctissimum in christo patrem et dominum SIXTUM QUARTUM divina providentia sacrosancte Romane ac universalis ecclesie Pontificem maximum De motibus celestium mobilium IOHANNES TOLHOPF Artium Magister. « Universitatis totius haut partem modicam... »

Rome to advise him concerning calendar reform, so that one wonders what relation there may have been between the work of JOHN TOLHOPF and of REGIOMONTANUS and PEURBACH. The latter's « new theory of the planets » was somewhat similar to that which TOLHOPF unfolds in his text and illustrates by a chart in colors which is folded into the manuscript. I shall treat more fully of TOLHOPF's work in my forthcoming book on *Science and Thought in the Fifteenth Century*.

85) In Reg. Suev. 1098, fols. 1r-15v, is a treatise by GEORGE OF TREBIZOND (1395-1484), the Greek scholar who really came from Crete, on *antiscia* (11) and why the predictions of astrologers often go wrong (12).

(86) Vatic. lat. 5377 is a manuscript full of marvelous waters, oils, secrets, and medical recipes for this and that complaint. At fol. 135r occurs the *Treatise of Marvelous Waters* ascribed to PETRUS HISPANUS (13), at fol. 137r a treatise of waters of master ALBERT OF ALAMANNIA, beginning with an *aqua vite* against hot and cold complaints, at fol. 146r a most precious electuary of Master GORDON which is presumably an extract from the medical writings of BERNARD GORDON, but most of the contents are anonymous. In a note I give some specimen headings (14).

87) WILLIAM BECCHIUS of Florence began his studies at the Augustinian convent in Padua in 1433, was made General of that Order in 1460, and bishop of Fiesole in 1470, from which position he resigned in 1481, dying later in extreme old age (15).

(11) For this feature of astrological technique consult BOUCHÉ-LECLERCQ, *L'astrologie grecque*, 1899, pp. 161-64.

(12) « Liber de antisciis et cur astrologorum iudicia plerumque fallunt. »

(13) It is discussed on the basis of other MSS in my *History of Magic and Experimental Science*, Vol. II, pp. 500-501.

(14) Fol. 130r, De aquis mirabilibus cum suis proprietatibus. Et sequitur primo aqua pro oculis, Aqua potabilis sic fit; fol. 130v, Aqua yrundinum sic fit; fol. 131r, Aqua laxanda vel laxativa, Aqua dealbativa sic fit; fol. 131v, Aqua conservativa, Aqua dupplicativa, Aqua saliue; fol. 132r, Alia aqua pro occulis ; fol. 132v, Aqua mirabilis et excellentissima ad spoliandum leprosos et lepram destruit omnem maculam occulorum delet et conservat occulum, Aqua pro occulis ad clarificandum; fol. 133r, Experimentum testissimum et approbatum contra tremorem membrorum, Aqua mirabilis contra debilitatem stomachi aut pro veneno aut pro epydinna...

Passing over some leaves, we come to : fol. 140r, de oleis, the last being, fol. 143v, Oleum de vitellis ovorum, Elixir vite; fol. 144v, Balneum marie sic fit. »

(15) GANDOLFO, *Diss. hist. de ducentis celeberrimis Augustinianis scriptoribus...* 1704, p. 147.

He wrote commentaries on ARISTOTLE's Ethics, Economics, and Politics. His work against Mohammedanism was printed in 1471. His treatise on the comet, addressed to COSIMO DE' MEDICI, is found in a Vatican manuscript, where it follows his discussion of the power of spirits (16).

88) Of the twelfth century work of WILLIAM OF CONCHES on natural philosophy there are some copies at the Vatican. I should need to examine Reg. Suev. 1222 to determine whether it is the original version under the title *De philosophia* or the revision addressed to the duke of Normandy and known as *Dragmaticon*, since the Incipit is missing, but Reg. Suev. 1021 and Palat. 1570 are clearly copies of the *Dragmaticon*.

89) The Vatican has at least two manuscripts of the work of WILLIAM OF ENGLAND, early in the thirteenth century, *On Urine Unseen*. In one case the catalogue erroneously ascribes the work to ANDALÒ DI NEGRO (17), but the Incipit, « Ne ignorantie vel invidie... » is in both cases that of WILLIAM's treatise (18).

90) To the interesting series of treatises on poisons addressed to popes by such physicians as PETER OF ABANO and ARMENGAUD BLASIUS may be added another by WILLIAM DE MARRA of Padua (19) who apparently wrote it for URBAN V (1362-70) (20).

91) In this closing paragraph I include some items which were overlooked until this article was complete and indexed, with some others which I have been unable to date or identify properly and had intended to omit but now include for the sake of greater completeness. Vatic. 901, fols. 136-43, GUIDO DE BONONIA

(16) Vatic. 4593, GULIELMI DE BOCHIS, fol. 1, de potestate spirituum, « Hora est iam nos de somno surgere... »; fols. 45-69r, de cometa, « Cum ad Sancti Marci bibliothecam pergerem... »

(17) Vatic. 4082, fols. 210-13.

(18) In Vatic. 5733, fols. 200-205r, the catalogue gives an unusual form of title, « Liber urinarum pro dispositione superiorum. » The text itself closes, « Explicit liber urinarum secundum magistrum GUILLELMUM astronomum. »

(19) Barberini 306. There are 157 pages — not leaves — of which 151-57 are occupied by a table of contents. « Incipit opusculum quod dicitur sertum papale de venenis. Exultent et letentur iam divina... »

(20) The pope does not seem to be named in the text, but on the preceding flyleaf we read, « FRANCESCO BARBERINO s. R. e. Cardinali Bibliothecario URBANI VIII Pont. Max. fratris filio Hunc librum de Venenis a GULIELMO DE MARRA Patavino URBANI V. p. m. medico compositum eidemque Pontifici dicatum ANDRONICUS SPINELLUS Patavinus eius ex fidei comm'sso heres atque Bibliothecae Vaticanae scriptor latinus. »

Questiones de gradibus formarum. Vatic. 2482, fol. 168, ANTONII MALGLANI DE' CHESIO de febribus in quinque partes divisus. Vatic. 3682, PANTALEONIS GUAIANI libellus de dentibus, opening, « Felices sunt beatissime pater... » Vatic. 4440, fol. 1, BARTHOLI SENENSIS Consilium pro PII SECUNDI dispositione, « Dispositio itaque naturalis... » Vatic. 6253, Magistri BONI liber computi de luna, « Compotus est... » Vatic. 8174 contains Scholia to astronomical tables for the years 1438, 1467, and 1470 composed by GABRIEL DE PIROVANO, and a translation from Castilian into Italian of the Libro di Astrologia of ALFONSO X made in 1341 by GUERUCCIUS (« GUERUCCII filioCIONIS FEDERIGHI civis Florentini »). Vatic. 8951, JOHANNES DE CALEMONTE Flandrinus, professor at Perugia 1467 A. D., ALFONSI regis tabule... cum additionibus. Barberini 343, fols. 60-64, Dialogus de salubritate aeris Romani, opening, « Questionum Tusculanarum liber primus... » Barberini 301, IO. BAPT. DONII de restituenda salubritate agri Romani, addressed to URBAN VIII. Barberini 350, fols. 61-65v, JOHANNIS FONTANA Venetus, De speculo, « Cum inferiorum cognitio ad coelestium conducat inquisitionem... » ; fols. 91-92, NICOLAUS ALAMANNUS pro equationibus duodecim domorum apud Florentiam. Ottobon. 31, fol. 117, RODIANI de lapide philosophorum sive opus triduanum. Ottob. 1289, DONNOLIS, (DE) FRANCISCI ALPHONSI Prolusio ad sue medicine cathedram quam in Patavina Accademia obtinuerat. Ottob. 1834, DETII (INCELOTI) Oratio de laudibus scientie in principio studii Papiensis. Ottob. 1545 and 1546, LEONARDUS PISANI Geometria. Ottob. 3307, LEONARDUS PISANI Arithmetica. Reg. Suev. 899, BONNET (HONORATI) doctoris Secretorum arbor bellarum ad CAROLUM VI regem Galliarum, in French, Reg. Suev. 1234, fol. 29, EMILII CAMPOLONGI nobilis Patavini de variolis. Reg. Suev. 1200, de lapide philosophorum seu opus mulierum et ludus puerorum. Palat. 1132, MATTHEI DE FERRARIA Expositio AVICENNE. Palat. 1222, GUIDO OF FORLI Opera varia medicinalia. Palat. 1215, PLATO DE DUISIS Herbarium. Palat. 1439, fols. 13r-39r, « Venerandissimo magistro patri ac domino domino IOHANNI archiepiscopo Strigonensi IOANNES GERMANUS DE REGIOMONTE... » Canons of Regiomontanus for the archbishop of Gran.

Columbia University LYNN THORNDIKE.
New York.

INDEX OF NAMES AND SUBJECTS.

The Arabic numerals have reference to the numbered paragraphs

Abraham Tortuosiensis, 48.
Aimerius, 81.
Air, 91.
Albert of Cologne, see Albertus Magnus.
Albert the Commentator, 2.
Albert of Saxony, 2.
Albertus Magnus, 1, 2, 3, 10, 48.
Albertus Praedicator, 1.
Albertus Theutonicus, 1.
Alcabitius, 44.
Alchandrus, 4.
Alchemy, 2, 13, 36, 63, 91.
Alchiranus, 59.
Alexander V, 49.
Alexandri Mathematica, 4.
Alexius Africanus, 59.
Alfonso X of Castile, 91.
Alfred of England, 10.
Algebra, 57.
Alhandreus, 4.
Almanac, 5.
Alquasiqui, 59.
Amicus de Sulmona, 6.
Andalò di Negro, 7, 89.
Andreas de Sommaria, 8.
Angelus Cardinalius, 19.
Angelus de Pergula, 9.
Animals, 45, 65.
Antonio Guaineri, 41.
Antonio Malglani, 91.
Aqua vitae, 86.
Aristotle, 3, 10, 11, 30, 48, 77, 87.
Arithmetic, 55, 77, 91.
Arlandi, see Stephanus.
Arnald of Villanova, 44.
Arnaldi, see Stephanus.
Arnaldus Aimerius, 81.
Arnaldus de Catussio, 82.
Astrolabe, 81.
Astrology, 4, 7, 8, 39, 42, 44, 46, 61, 69, 71, 85, 89.
Astronomia, Tractatus de, 42.
Astronomy, 5, 7, 8, 11, 20, 34, 35, 65, 69, 75, 77, 82, 84, 91; and see Astrolabe, Calendar, Comet.
Augustinus, 30.
Averroes, 10, 12, 13.
Avicenna, 13, 17, 65, 91.
Avogaro, 7.

Bacon, Roger, 1, 73.
Badianus, 47.
Barnabas de Riatinis, 14.
Bartholomaeus Anglicus, 15.
Bartholus Senensis, 91.
Bartolammeo de Montagnana, 16.
Bartolotti, 17.
Bate, Henry, 43.
Beldomandis, 31.
Benedict XII, 40, 82.
Becchius, 87.
Benedict of Nursia, 18, 52.
Benevenutus, 19.
Benjamin the Jew, 36.
Benvenutus Graphaeus or Grassus, 19.
Bernard Gordon, 86.
Bernardus de Verdun, 20.
Bessarion, 21, 38.
Biagio Pelacani, 22, 73.

Björnbo, 1.
Blasius of Parma, 22, 73.
Bodin, 23.
Boethius, 10.
Bonacosa, 12.
Bondelmontibus, see Christopher de.
Bongiovanni, 24.
Bonjohannes of Messina, 24.
Bonnet, H. 91.
Bono, Pietro, 7.
Bonus, 91.
Burgundio of Pisa, 75.

Calendar reform, 72.
Campolongi, 91.
Cardinalius, 19.
Cecco d'Ascoli, 44.
Chancellor, Experiments of, 36, 51.
Charles V, of France, 51, 69.
Charles VI of France, 91.
Charms, 25.
Christina of Sweden, 23.
Christopher de Bondelmontibus, 26.
Chrysoloras, 49.
Claudianus, 8.
College of Constantinople, 35.
Comet, 8, 27, 64, 87.
Congelatione et conglutinatione lapidum, De, 13.
Conjurations, 25.
Constantinus Africanus, 28.
Contarini, 29.
Costa ben Luca, 10, 30, 82.
Counterpoint, 31.
Coussemaker, 31.
Critical days, 6, 43.
Cylinder called horologe of travelers 32.

Dati, or Datus, John, 33.
Datis, Jordanus de, 55.
Demons, 14; and see Spirits.
Detius, I., 91.
Differentia spiritus et anime, De, 10, 30.
Directionis, Tractatus, 1.
Dominicus Bandinus, 34.
Dominicus de Clavasio, 35.
Donnolis, F. A. de, 91.
Donius, J. B., 91.
Dreams, 70.

Elements, 29.
Enoch, 44.
Experiments, books of, 36, 51.
Eye, 19, 53, 82.

Faber, Stapulensis, Jacobus, 37.
Falcucci, 67.
Fernandus of Cordova, 38.
Filippo Maria, 41.
Fire, 63.
Firminus de Bellavalle, 39.
Food, 14.
Francisco de Mendoza, 47.
Frederick II, emperor, 65.

Gabriel de Pirovano, 91.
Galeazzo de Sancta Sophia, 78.
Galen, 6, 36, 48, 66, 75.
Galvanus de Levanto, 40.
Geminius, 79.
Generation, 68.
Gentile da Foligno, 3.
Geography, 26, 49.
Geometry, 35, 62, 91.
George of Trebizond, 85.
Gerard of Cremona, 57.
Gordon, Bernard, 86.
Graphaeus, 19.
Grassus, 19.
Gregory XI, 50.

Grumerus of Piacenza, 48.
Guaianus, Pantaleo, 91.
Guaineri, 41.
Guaynerius, 41.
Gueruccius, 91.
Guido de Bononia, 91.
Guido of Forlì, 91.

Haly, 44.
Harpocration, 59.
Hartman, Nicolaus, 27.
Henry Bate, 43.
Henry of Cologne, 65.
Henry of Ghent, 33.
Henry of Hesse, 42.
Henry of Malines, 43.
Henry of Saxony, 3.
Herb, 44, 47, 48, 59, 91.
Hermes and Hermetic books, 44.
Hieroglyphics, 45.
Hippocrates, 9.
Horapollo, 45.
Hugo de Civitate Castellis, 46.
Hunain ibn Ishak, 48.

Indian and Indies, 47.
Innocent VIII, 72.

Jacobus Albensis, 48.
Jacobus Alexandrinus, 48.
Jacobus Angelus, 49.
Jacobus de Forlivio, 6.
Jacobus Faber Stapulensis, 37.
Jacobus Henricus de Alba, 48.
Jean Bodin, 23.
Jean de Murs, 31.
John XXII, 82.
John Badianus, 47.
John de Calemonte, 91.
John de Casali, 50.
John dei Donti, 62.
John Fontana, 91.
John Holywood, 46, 77.
John James Bartolotti, 17
John James, chancellor of Montpellier, 51.
John Marlianus, 52.
John de Merliano, 52.
John Molinerii, 53.
John de Palma, 54.
John of Parma, 54.
John Paulinus, 36.
John Peckham, 73.
John of Spain, 30.
John Tolhopf, 84.
John de Turre, 56.
Jordanus di Turre, 56.
Jordanus, 55.
Jordanus de Datis, 55.
Jordanus Nemorarius, 55.

Katoptrik, 1.
Khowarizmi, Al-, 57.
Kilwardby, 58.
Kiranides, 59.

Leo X, 72.
Leonard of Bertipaglia, 60.
Leonard of Pisa, 91.
Leonardus Qualea, 61.

Magic, 36, 37; and see Charms.
Magorinus, 62.
Magrobonus, 62.
Manetti, Jannotti, 64.
Manfred, 10.
Marcus Grecus, 63.
Marliani, Giovanni, 52.
Martin de la Cruz, 47.
Matthaeus de Aquila, 64.
Matthaeus de Ferraria, 91.
Medici, Cosimo de, 87.
Medicine, 7, 9, 14, 16, 18, 19, 24, 28, 36, 40, 41, 51, 54, 56, 62,

66, 67, 75, 78, 80, 82, 91; history of, 17; and see Critical days, Eye, Herb, Pest, Poison, Urine.
Melchior John, 9.
Michael Savonarola, 80.
Michael Scot, 65.
Mirabilibus mundi, De, 2.
Molinerii, 53.
Montanus, Io. Bapt., 66.
Monteus, 36.
Motion, 50, 52.
Mundinus, 3.

Niccolò Falcucci, 67.
Niccolò da Foligno, 68.
Niccolò of Tivoli, 79.
Nicholas V, 16.
Nicolas Oresme, 69.
Nicolaus Alamannus, 91.
Nicolaus Damascenus, 48.
Nicolaus Florentinus, 67.
Nikolaos Sophianis, 81.

Oil, 1, 86
Optics, 1, 44, 73,
Oresme, 69

Pantaleo Guaianus, 91.
Paolo della Pergola, 9.
Paschal the Roman, 70.
Paul III, 71
Paul of Limoges, 2
Paul of Middelburg, 72.
Peckham, 73.
Pelacani, 22, 73.
Perspective, see Optics.
Pest tractates, 18, 41, 51, 52, 74.
Peter of Abano, 75.
Petrus Hispanus, 86.
Peurbach, 84.
Philip the translator, 45.
Philippus de Vitriaco, 31.
Philosophy, 10, 21, 33, 58, 68, 88.
Physiognomy, 65, 75.
Pietro Bono Avogaro, 7.
Pirovano, Gabriel de, 91.
Pius II, 91.
Plato de Duisis, 91.
Platonic ideas, 68.
Poison, 41, 67, 75, 76, 90.
Polcastris, Sigismundus de, 80.
Pomo, De, 10.
Portior medicinarum, 24.
Princivallus, 24.
Prosdomico de Beldomandis, 31.
Psychology, 30.
Ptolemy, 7, 8, 49.

Qualea, 61.
Quantity, 79.

Rabanus Maurus, 15.
Rasis, 36.
Regiomontanus, 84, 91.
Reguardati, Benedetto di, 18, 52.
Robert of Chester, 57.
Robert Kilwardby, 58.
Rodianus, 91.
Roger Bacon, 1, 73.

Sacrobosco, 46, 77.
Sancta Sophia, Galeazzo of, 78.
Savonarola, Michael, 80.
Scientific method, 38.
Secretis mulierum, De, 3.
Secrets, 2, 86; of Galen, 36; of James, 44; of art of war, 91.
Secretum secretorum, 3, 10.
Secundus philosophus, 10.
Semita recta, 2.
Sforza, Francesco, 18.
Sigismundus de Polcastris, 80.
Simon of Cremona, 57.
Simon Geminius, 79.

Simplicius, 11.
Sixtus IV, 18, 84.
Sophianos, 81.
Speculis et luce, De, 44.
Speculum astronomiae, 2.
Spirits, 14, 42, 87.
Stapulensis, 37.
Stephanus Arlandi (Arnaldi?), 82.
Stomach, 40.
Stone, 44.
Summa of theology, 1.
Surgery, 60.

Tacuinum, 5.
Taddeo da Firenze, 36.
Teselaus, 59.
Thaddeus of Florence, 36.
Theology, 1, 21, 23.
Thomas de Albino, 10.
Thomas de Aquino, 10.
Thomas of Cantimpré. 83.
Tolhopf, John, 84.
Tommaso Bongiovanni, 24.
Translation, 10, 11, 12, 13, 30, 45, 47, 48, 49, 57, 59, 75, 81, 82, 91.
Trebizond, George of, 85.

Urban V, 90.
Urban VIII, 91.
Urine, diagnosis, 38, 89.

Waters, 62, 86.
Weather prediction, 39.
William Becchius, 87.
William of Conches, 88.
William of England, 89.
William de Marra, 90.
William of Moerbeke, 11.
Women, diseases of, 3, 41.

INDEX OF MANUSCRIPTS.

Bologna A. 125 80
Brussels 10875 37
Erfurt, Amplon. F37 35
F386 20
F393 20
F395 35
Q299 35
Q352 35
Escorial f. II.17 26
Florence, Ashburnham 210 69
Biscioniani 25 18
Gaddi reliq. 209 14
Laurent. Plut. 82 cod. 22 68
Oxford, Balliol College 99 11
Digby 103 70
ris, Bibliothèque Nationale 6746 64
6957 51
6988A 51
7066 56
7333 20
7334 20
7482 39
10624 61
16610 70
17868 4
nouveau fond latin 1391 56
Rome, Vatican lat. 822 83
901 91
989 8
1279 78
2185 35
2191 43
2225 52, 56, 79
2375 36

Rome, Vatican lat. 2385 36
2416 36
2418 36
2442 67
2443 67
2444 67
2445 67
2463 40
2469 6
2482 1, 41, 91
2975 1, 73
3026 50
3088 42
3099 5
3102 73
3103 84
3121 34
3163 41
3165 29
3177 38
3682 91
3684 72
3686 81
3687 71
3689 71
3690 71
3691 71
3714 14
3897 68
3898 45
4082 7, 69, 73
4084 4
4085 7
4091 2
4092 2
4275 2, 69
4422 36, 48, 54
4425 2, 36
4426 13, 30
4428 13
4437 36
4440 91

Rome, Vatican lat. 4456 3
4462 24, 36
4476 25, 36
4482 2
4572 5
4593 87
4606 57
4864 2, 25, 36
5004 1
5321 31
5328 58
5373 7, 19
5376 17
5377 63, 86
5698 49
5733 44, 57, 89
5906 7
5963 73
6253 7, 91
6266 18
6267 59
6863 75
6867 61
6887 45
7180 71
7273 36
7274 36
7275 36
7610 59
7806A 27
8174 91
8759 41
8951 91
9018 3
9369 42
9402 21
9412 12
9414 58
9420 9
9941 13
9952 59
10064 83

Rome, Vatican, Barberini 165 10, 36
166 36
178 46, 75
186 52
241 47
256 75
268 64
270 26
279 18
301 91
305 65
306 90
332 75
341 75
343 91
350 73, 91
357 22, 73
473 15
732 22

Rome, Vatican, Ottobonian 31 91
309 55
370 72
874 27
1180 66
1289 91
1545 91
1546 91
1552 44
1834 91
1850 73
1870 63, 70
2120 55
2254 11
2484 27
2493 27
2520 33
3024 77
3030 67
3290 77
3307 91

Rome, Vatican, Palatine Graec. 226 59

Palatine Lat. 310 3
828 73
1132 91
1170 3
1173 55
1194 41
1199 36
1205 36
1210 51
1211 36, 43
1212 55
1213 62
1214 41
1215 91
1221 41
1222 91
1225 82
1229 51, 62
1234 59, 82
1240 51
1248 2
1268 36
1272 36
1273 36, 59
1278 59
1279 59
1316 16
1328 36
1330 2
1331 82
1332 62
1335 44
1340 2, 32, 39
1354 44
1369 73
1375 44
1377 55
1380 20, 55
1394 36
1416 4

1438 27
1439 91
1445 2
1570 88

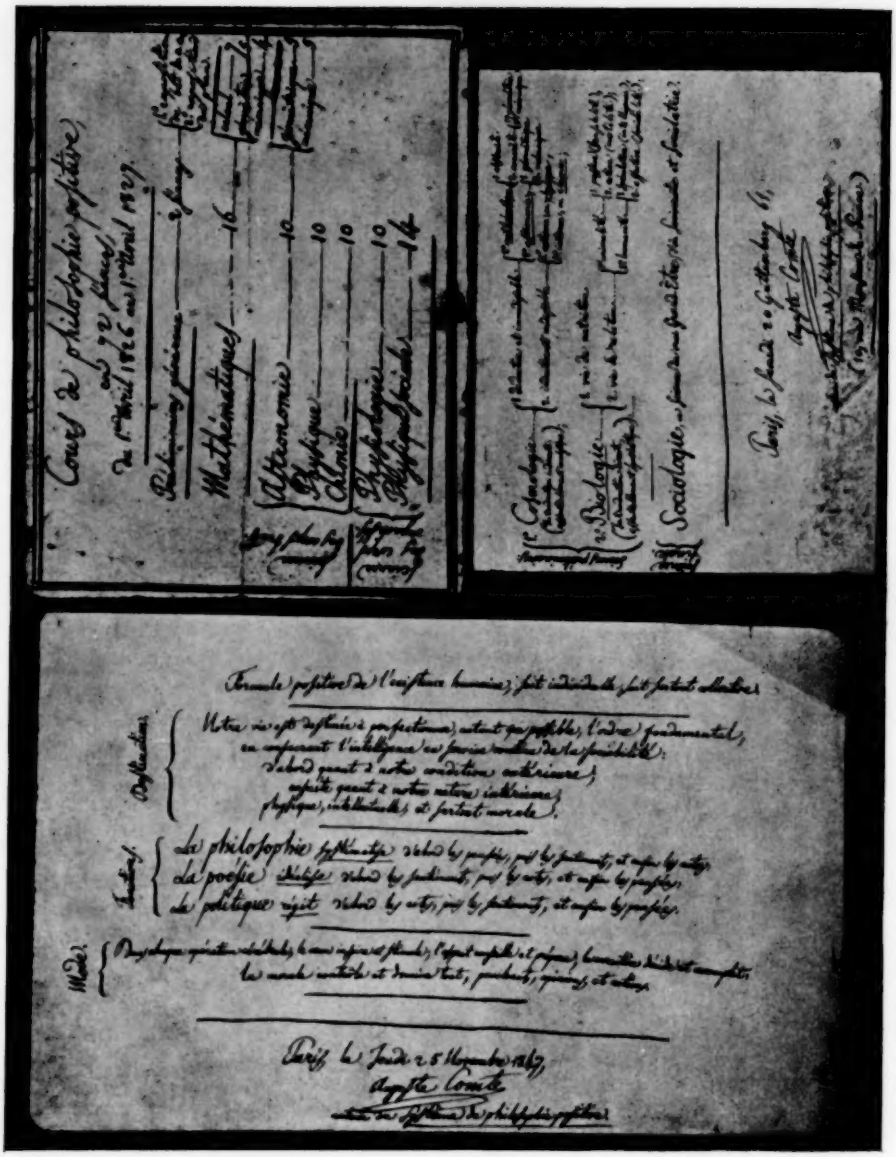
Rome, Vatican,
Reg. Suev. 373 19
899 91
1021 88
1098 85
1115 37
1129 36
1200 91
1222 88
1234 91
1313 23
1770 2
1773 38
1847 53
1969 60

Rome, Vatican,
Rossianae 421 65
Venice, St. Marco XI, 17 (Valentinelli) 80
XI, 82 (Valentinelli) 75
L.VII.LI (XIV, 28, Valentinelli) 66
XIV, 37 (Valentinelli) 59
XIV, 43 (Valentinelli) 3
Wolfenbüttel 2916 82
4007 60

INDEX OF INCIPITS

Accipe tabulam plenam 1
Ad te, principum et ducum illustrissime 41
Aevum vel aeternitatem 45
An quantitas 79
Antiquorum principum, reverendissime presul 17
Circa lib. de coelo 35
Complexio est qualit. 17
Compotus est 91
Corpora mineralium 13
Cum ad Sancti Marci bibliothecam pergerem 87
Cum multis sane 81
Dimissis que in primo librorum solent adduci 9
Dispositio itaque naturalis 91
Dixit Galenus, Ignis qui 36
Exultent et letentur iam divina 90
Felices sunt beatissime pater 91
Frederice Romanorum imperator, domine mundi 65
Grave onus non minusque laboriosum 80
Hic post laudem dei et ipsius exaltationem 57
Hora est iam nos de somno surgere 87
Igitur quoniam in hac arte 4
In nomine sancte crucis et summi 53
In planis speculis 73
Incipit compendium de naturis et proprietatibus 14
Inter phisice considerationis studia lux 73

Interrogasti de differentia 30
Iuvat me diu versatum 34
Lux naturae deus 61
Magna diu questio 71
Montes vero quandoque 13
Motus stellarum an sit scibilis nescio 8
Multi principes 69
Ne ignorantie vel invidie 89
Nichil est, princeps magnanime 41
Oculorum calida 2
Omnes herbe et radices 36
Omnis sapientia 2
Paulus apostolus 21
Prima earum, inquit Galenus 48
Proficiscor quempiam non delectat 40
Quando ventilata fuit 12
Quantumcumque scientia medicine quis polleat 40
Queritur de forma 1
Questionum Tusculanarum liber primus 91
Quia ex scienciis fructu dignioribus 20
Quia in multis voluminibus sapientes antiqui 39
Quia libenter scire 42
Quoniam celos 34
Quoniam iuxta Phtolomeum 75
Quoniam quidam 54
Quos vides inter scholasticos 38
Recipe vitellum unius ovi 36
Rogasti me amice 36
Salvat te Deus, fili mi Iohannes, in veritate te 56
Seculum signere 45
Sepe ac multum 79
Sepe metum post illum tremendum 64
Sicut dicit commentator 46
Statuis et collossis faciundis 63
Summo cum studio decet emergentes 18
Talentum mihi traditum 2
Terra pura non fit 13
Unitas est principium numeri 57
Universitatis totius haut partem modicam 84
Ut animalium quidam 65
Utrum in mobilibus ad qualitatem id semper 50
Venerandissimo magistro patri 91
Volens de intestinorum egritudinibus doctrinam 41
Zenonem et Crispum maiora egisse 69



Isis, XIII, pl. 2 A. COMTE.

Notes and Correspondence.

Answer 3. GIOVANNI DE' FONTANA.

In reply to Dr. SARTON's Query (*Isis*, 7, 105, 1925) it may be noted that in a manuscript at the Vatican — Barberini Latin Ms. 350, 14th-15th century, fols. 61-65v — is a treatise *De speculo* ascribed to JOHANNES FONTANA Venetus, or GIOVANNI DE' FONTANA of Venice. The work opens, « Cum inferiorum cognitio ad coelestium conducat inquisitionem... » and closes, « ... alio modo et commodius videtis. » On the other hand, QUETIF and ECHARD, *Scriptores ordinis praedicatorum*, etc., Paris, 2 vols., 1719-1721, I, 772, tell of a JOANNES FONTANA of Piacenza who about 1420 wrote an « Opus in quo multa moralia », in the manner of the *Speculum historialis* of VINCENT OF BEAUVAIS. They found no record of this work being extant, however.

Columbia University, New York LYNN THORNDIKE.

Trois autographes inédits d'Auguste Comte (1826, 1847, 1850). Nous devons à l'obligeance de M. ROUSSEAU, secrétaire de la Société positiviste (10 rue Monsieur-le-Prince, à Paris) et de Mme P. METZGER la communication des documents dont nous publions ci-joint des fac-similés et des transcriptions.

I. (*Document de* 1826. *Peut-être le manuscrit d'une affiche?*)

Cours de philosophie positive
en 72 séances
du 1 avril 1826 au 1 avril 1827.

Préliminaires généraux... 2 séances...
1e exposition du but de ce cours
2e exposition du plan

Mathématiques	16 séances	calcul 7 géométrie 5 mécanique 4
Science des corps bruts :		
Astronomie	10	géométrique 5 mécanique 5
Physique	10	
Chimie	10	

Science des corps organisés :

Physiologie	10
Physique sociale	14

II. (*Document de* 1847)

Formule positive de l'existence humaine, soit individuelle, soit surtout collective.

Destination : Notre vie est destinée à perfectionner, autant que possible, l'ordre fondamental, en consacrant l'intelligence au service continu de la sociabilité : d'abord quant à notre condition extérieure; ensuite quant à notre nature intérieure, physique, intellectuelle et surtout morale.

Fonctions : La philosophie *systématise* d'abord les pensées, puis les sentiments, et enfin les actes. La poésie *idéalise* d'abord les sentiments, puis les actes, et enfin les pensées. La politique *régit* d'abord les actes, puis les sentiments, et enfin les pensées.

Mode. Dans chaque opération cérébrale, le cœur inspire et stimule; l'esprit conseille et prépare; le caractère décide et accomplit : la morale contrôle et domine tout, penchants, opinions, et actions.

Paris, le jeudi 25 Novembre 1847,
Auguste Comte,
auteur du Système de philosophie positive.

III. (*Document du* 1er *septembre* 1850)

- Sciences préliminaires
  - 1° Cosmologie (Introduction indirecte; essentiellement analytique)
    - 1. déductive et immodifiable
      - 1° *mathématique*
        - 1. abstraite
        - 2. concrète
          - 1° géométrie
          - 2° mécanique
      - 2° *astronomie*
        - 1. géométrique
        - 2. mécanique
    - 2. inductive et modifiable
      - 1° externe, ou *physique*
      - 2° interne, ou *chimie*
  - 2° Biologie (Introduction directe; essentiellement synthétique)
    - 1. vie de nutrition
      - 1° animalité
        - 1. passive (sensibilité)
        - 2. active (motilité)
    - 2. vie de relation
      - 2° humanité
        - 1. spéculative (intelligence)
        - 2. affective (sociabilité)

Science finale { Sociologie, ou Science du vrai Grand-Etre, d'où Sociocratie et Sociolatrie.

Paris, le samedi 20 Guttemberg 61,
AUGUSTE COMTE,
(auteur du Système de philosophie positive
(10, rue Monsieur-le-Prince).

Madame METZGER nous écrit à ce sujet : « M. ROUSSEAU m'a montré un grand nombre d'autres manuscrits du même ordre, non destinés à être publiés, qui devaient permettre à COMTE de préciser sa propre pensée. Il est intéressant de noter que le fondateur du positivisme s'exprimait pour lui-même en tableaux présentant des accolades; l'ordre y est parfait autant que systématique, immuable; et peut-être les échantillons photographiés ci-contre [c.a.d., les trois documents ici publiés] éclaireront-ils d'une manière intuitive certains aspects de la doctrine qui veut être à la fois doctrine définitive et doctrine de progrès. »

GEORGE SARTON.

Back volumes of ISIS. Members having odd copies of vols. I, or III, or VI, or of N° 9 and 16 will do to the History of Science Society a great favor by sending them to the Secretary, Mr. F. E. BRASCH, Smithsonian Division, Library of Congress, Washington, D. C. Mr. BRASCH is willing to pay five dollars for each clean and complete copy of vol. I or vol. III or VI, and two dollars for each copy of N° 9 or 16.

Reviews

Ḫunain ibn Isḥâq. — *The book of the ten treatises on the eye ascribed to* Ḥunain ibn Isḥâq (809-877 A. D.). The earliest existing systematic text-book of ophthalmology. The Arabic text edited from the only two known manuscripts, with an English translation and glossary by Max Meyerhof. LIII + 227 p. Arabic text, 230 p. Cairo, Government Press, 1928.

The learned editor of this ophthalmological treatise, Dr. Max Meyerhof, an old friend of *Isis*, had been engaged for many years in its study (see my *Introduction*, vol. 1, 612), and students of Muslim medicine were awaiting its publication with keen curiosity. Their patience is now fully rewarded, for they have not only what the editor had promised but much more. Some of the fruits of Meyerhof's painstaking investigations had been published before in many papers, notably the *New light on the early period of Arabic medical and ophthalmological science* (Cairo, 1926; *Isis*, 10, 249) and *New light on Ḫunain ibn Isḥâq* (*Isis*, 8, 685-724, 1926).

The Arabic text of Ḫunain was long believed to be lost, but the great master of the history of ophthalmology, Julius Hirschberg (1843-1925) had had the acumen to discover its Latin version in spite of two false titles, that is, to identify it with the *Galeni Liber de oculis translatus a Demetrio* (in *Galeni opera*, Venice, 1541-45, vol. 8, 683, 1545, and in other Galenic editions) and with the *Liber de oculis Constantini Africani* (in *Omnia opera Ysaac*, Lyon, 1515, 172-78). He gave a complete proof of that identification in his paper *Über das älteste arabische Lehrbuch der Augenheilkunde* (*Sitzungsber. d. Preuss. Ak.*, vol. 49, 1903). In 1908, Dr. Meyerhof found the Arabic text (or, let us say an Arabic text closely connected with it) in the rich library of Aḥmad Taimûr Pâshâ in Cairo. This Ms. was unfortunately incomplete, but the editor was able to complete it almost entirely by reference to a better one in Leningrad, and (to a smaller extent) by means of two quotations in the *Kitâb al-ḥâwî* of al-Râzî. The text thus obtained is written in a very poor language, full of barbaric idiosyncrasies, which would suggest that it was not composed by Ḫunain himself, but by Ḫubaish ibn al-Ḥasan or by another disciple, or, if Ḫunain was really the author, that it was gradually adulterated in the process of transmission. Whichever

the case, it seems fair to put ḤUNAIN's name upon it, because it has generally been ascribed to him. We may assume that it is ḤUNAIN's treatise, if not verbatim, at least in substance.

MEYERHOF's introduction contains a list of the early Arabic ophthalmological treatises which is worth reproducing. It is somewhat different from the list given by him in 1926 (for which, see *Isis*, 10, 249).

I. *Daghal al-'ain* (The alteration of the eye) by ABÛ ZAKARIYYA YÛHANNÂ B. MÂSAWAIH (777 to 857 A. D.).

II. *Ma'rifat miḥnat al-kaḥḥâlîn* (Knowledge of the oculists' examination), ascribed to the same IBN MÂSAWAIH.

III. *Al-'ashr maqâlât fîl-'ain* (The ten treatises on the eye) composed by ḤUNAIN IBN ISḤÂQ (809 to 877 A. D.).

IV. *Kitâb al-masâ'il fi-l-'ain* (The book of the questions on the eye) ascribed to the same ḤUNAIN B. ISḤÂQ. It is an extract from the first six treatises of the foregoing book, in the form of 207 questions and answers on the anatomy, physiology and pathology of the eye, without considering treatment.

V. *Jawâmi' kitâb Jâlînûs fi-l-amrâḍ al-ḥâditha fîl-'ain* (Summary of GALEN's book on the diseases originating in the eye). It may be an extract of GALEN's lost book On the diagnosis of eye-diseases. It is a simple enumeration of 91 eye-diseases and their symptoms, intermixed with many Greek terms.

VI. *Kitâb al-baṣar wal-baṣîra* (The book of vision and perception) attributed to THÂBIT B. QURRA of Ḥarrân (836 to 901 A. D.). It is a shameless plagiarism of the later mentioned text-book of 'AMMÂR.

VII. *An-nihâya w'al-kifâya fi tarkîb al-'ainain.* (The aim and sufficiency of (instruction concerning) the structure of the eyes) by KHALAF AT-ṬÛLÛNÎ, who composed this book, probably in Egypt, during the years from 877 to 914 A. D.

VIII. *Firdaws al-ḥikma.* The paradise of wisdom completed in 850 A. D. by 'ALÎ IBN RABBAN AT-ṬABARÎ.

IX. *Al-ḥâwî.* Continens, by AR-RÂZÎ (d. about 923 A. D.).

X. *Tadhkirat al-kaḥḥâlîn.* Note book of oculists by 'ALI IBN 'ISÂ about 1000 A. D., by far and away the best and most complete text-book on eye-diseases. It contains the whole of Greek oculistic science as transmitted by ḤUNAIN, with many practical additions.

XI. *Al-muntakhab fi 'ilâj amrâḍ al-'ain.* Selection in the treatment of eye-diseases by 'AMMÂR B. 'ALÎ AL-MAWṢILÎ (Egypt, about 1000 A. D.). A shorter, but equally excellent text-book with many original remarks and observations.

XII. *Tarkîb al-'ain wa ashkâlhâ wa-madawât 'ilalhâ.* Structure of the eye, its formation and the treatment of its diseases by 'ALÎ B. IBRÂHÎM B. BAKHTÎSHÛ', about 1067 A. D.

XIII. *Ṭibb al-'ain*. Medicine of the eye, by JIBRA'IL B. 'UBAÎDALLÂH B. BAKHTÎSHÛ' (d. 1006 in Baghdâd).

XIV. *Al-Qânûn fi-ṭ-ṭibb*. Canon of medicine, by IBN SÎNÂ (d. 1037 A. D.).

XV. *Kâmil as-Ṣinâ'a*. The complete text-book of the art, by 'ALÎ IBN AL-'ABBÂS. (d. 994 A. D.).

XVI. *Al-mu'alaja al-Buqrâṭiyya*, by ABÛ-L-ḤASAN AḤMAD B. MUḤAMMAD AT-ṬABARÎ (second half of the Xth century A. D.).

XVII. *At-taṣrîf*. The explanation, by ABÛ-L-QÂSIM KHALAF B. AL-'ABBÂS AZ-ZAHRÂWÎ (d. 1013 A. D.).

Nos. VIII, IX, and XIV to XVII are general medical books which contain ophthalmological sections.

After the XIth century a slow decline set in but « it must be admitted that in ophthalmology even the latest Arabic treatises are very much superior to the text-books produced in Europe before about 1700 A. D. »

To return to n° III which is the treatise edited and Englished by MEYERHOF, its full title is « The book of ḤUNAIN IBN IṢḤÂQ on the structure of the eye, its diseases and their treatment according to the conception of HIPPOCRATES and GALEN, in ten treatises. » It is essentially derived from GALEN. Each of the ten treatises may be briefly characterized as follows :

I. Anatomy of the eye. After GALEN's *De usu partium* book X.

II. Description of the brain. After GALEN's *De usu partium*, VIII.

III. Optic nerves, hypothetical visual spirit, vision. After *De usu partium*, X, *De placitis* HIPPOCRATIS et PLATONIS, and possibly *De demonstratione*. « ARISTOTLE, GALEN and ḤUNAIN adopt PLATO's theory of the meeting of the light-rays, i.e., that the light reflected from the objects meets the 'luminous rays' of the vision, the emanation of the 'luminous spirit' which streams from the brain, through the optic nerves, the lens and the pupil. The intermediary between the two rays is supposed to be the air. »

IV. Nosology, etiology, symptomatology.

V. Causes of eye diseases.

VI. Symptoms of the diseases of the conjunctiva « An entirely new fact, which here comes to light, is that the vascularised opacity of the cornea, known by the name *pannus*, was not observed for the first time by the Arabs but was known to the Greeks under the name of kirsophthalmia (ophthalmia varicosa). » Diseases of the lid, lachrymal duct, cornea. Hidden diseases. This treatise is particularly interesting because it has no model in GALEN's existing works.

VII. Properties of the simple remedies.

VIII. List and appreciation of the simple remedies for the eye.

IX. Treatment of eye diseases, « but without order, and several times interrupted with theoretical expositions on general diseases. »

X. Historical note explaining the genesis of this work. Eye salves and dry collyria.

The editor concludes his analysis with a general appreciation, a part of which may be quoted verbatim :

« The lenght of the treatises is not uniform and their value differs greatly. In accordance with his philosophical and speculative predilections, Ḥunain has treated anatomy, physiology, nosology and pharmacology at excessive length, whilst the parts concerned with symptomatology and practical treatment are too short. He follows, moreover, like the Greeks before, and the first Arabs after his time the method of treating e.g. of the same disease three times, in different chapters or treatises; first the etiology then the symptoms and finally the treatment. The method by which a disease, its etiology, semiology and treatment are explained in the same chapter, as is the case in present-day text-books, has been followed since the XIth century A. D. (ʿAlî b. ʿIsâ and ʿAmmâr). Nevertheless Ḥunain's book is immensely superior to the confusedly compiled ophthalmology of his teacher Yûḥannâ b. Mâsawaih. Therefore we call it the earliest existing systematic text-book of ophthalmology.

« Very interesting are the unique diagrams in this book, which must have been eight or ten in number, several of which, however, are missing, so that there remain only five. As the whole book is an extract from Greek works, it is certain that these diagrams were originally in Hellenic text-books and were copied by the translating Syrian and Arab physicians. They are, likewise, the earliest known diagrams of the anatomy of the eye, and much superior to those of the European medieval text-books. »

For the translation, Dr. Meyerhof has derived much assistance from the Greek texts; it was often necessary to refer to them as the Greek terms introduced in the Arabic treatises were frequently mutilated, as we would expect. On the contrary the Latin translations were seldom useful « as both of them simply omit to give the most difficult passages of the original text. »

To the Arabic text and the English translation, the editor has added many notes derived from his comparisons with other, chiefly Greek, texts, Arabic and Greek indices, a general index, and an excellent glossary of medical terms in Arabic, Greek, and English. In short, this is a model edition. Let us hope that Dr. Meyerhof will be able to edit the *Masâ'il fî-l-ʿain* and other early ophthalmological treatises in the same style, and that he will some day receive his best reward and achieve the main ambition of his life by discovering the Arabic text of Ibn al-Haitham's Optics.

George Sarton.

Opera hactenus inedita ROGERI BACONI, Fasc. IX, *De retardatione accidentium senectutis cum aliis opusculis de rebus medicinalibus*, nunc primum ediderunt A. G. LITTLE, E. WITHINGTON, XLIV + 224 p. Oxford, Clarendon Press, 1928.

The work under review appears in two different series, namely as fascicle 9 of the unedited works of ROGER BACON, which have been coming out for some time under the general editorship of Mr. ROBERT STEELE, and as volume XIV of the publications of the British Society of Franciscan Studies. Mr. LITTLE and Mr. WITHINGTON have cooperated in a very satisfactory piece of editing in this volume of ROGER BACON's medical works, and the Oxford University Press has printed the same in attractive style. In the former series as usual the work appears in paper covers; in the Franciscan studies it is more durably bound in cloth and boards.

After an Introduction in two parts by the respective editors we are given the text of BACON's letter on retarding the accidents of old age which constitutes the *pièce de résistance* of the volume. There then follow the briefer supplementary tracts along the same line of preserving youth and warding off old age, on the subjects of baths, of drugs, of compound medicines and varying degrees in medicines, and on the errors of medical men. In the Appendix appear three further Latin texts, an extract from the Book of Six Sciences which has not appeared in its present form in any of BACON's printed works and the two discussions on critical days which have been previously published in the doctoral dissertations of F. PALITZSCH and H. ELFFERDING. The Latin texts are accompanied by numerous variant readings at the bottom of each page and by helpful marginal analysis of the content of the work in English. At the close of the volume are further explanatory notes and a useful glossary of drugs.

In his Introduction Mr. LITTLE gives a full and interesting account of the manuscripts of the works in question and establishes that the treatise on old age was in all probability sent to Pope INNOCENT IV (1243-1254), although it was apparently rededicated later to ALPHONSE OF POITIERS, the brother of LOUIS IX. ROGER BACON's habit of revising and annotating his works receives, indeed, several illustrations in the volume before us. In the texts themselves he also is very repetitious, after his wont. They are, nevertheless, quite interesting reading to one concerned with the science and superstition of that time.

Mr. WITHINGTON deals in his part of the Introduction with the medical content of the works in question. He decides « that the Epistle and treatises on old age are a grievous disappointment as coming from one so great in other departments. They show want of originality, and close dependence on authorities he might have known were at best second

hand, a simple faith in the marvellous power of remedies most of which had been used for centuries with no remarkable results, and sometimes a pretense of secret knowledge which reminds us painfully of the alchemic quacks and mystics of a later age ». Mr. WITHINGTON finds, however, that « ROGER's scientific genius is more prominent in the other treatises ». But even in these the fact stands out that BACON had greater confidence in the power of drugs than in medicine in the full and proper sense of the term; and that « though by nature a rebel against authority », he « nevertheless accepts without question a theory of medicine eminently based upon authority, the system of GALEN as further formularized and stereotyped by AVICENNA and the 'Arabs' ». But for this very reason BACON's medical opuscula continually throw light upon the medicine of that time, although they do not represent it at its very best.

We hope that the publication of ROGER BACON's hitherto unedited works may continue to maintain the high standard which has been set in this and previous volumes which have appeared under Mr. STEELE's editorship. The appearance of each successive volume in this series is a welcome event in the study of ROGER BACON and the science of his time.

LYNN THORNDIKE.

Hugo J. Seemann. — ***Die Instrumente der Sternwarte zu Marâgha nach den Mitteilungen von*** AL 'URḌÎ. Sonderabdruck aus den ***Sitzungsberichten der Physikalisch-medizinischen Sozietät zu Erlangen***, Band 60, 15-126, Erlangen, 1928.

HÛLÂGÛ left Mongolia in 1253 and within a few years defeated the armies of the Ismâ'ilîs and of the Caliphate. Alamût was taken in 1256-57; Baghdâd, in 1258. Among the Ismâ'ilîs of Alamût he had found the great mathematician NÂSIR AL-DÎN AL-ṬÛSÎ (1201-74), whom he attached to his service. With NÂSIR AL-DÎN's collaboration he established in 1259 an observatory at Marâgha, (in north western Adharbâijân) — a place where he liked to reside in summer time. No expenditure and no pains were spared to equip that observatory as well as was possible in those days. An immense library — the fruit of HÛLÂGÛ's plunders in Baghdâd, Mesopotamia and Syria — was connected with it.

The construction and organization of this scientific institute was intrusted to NÂṢIR AL-DÎN, assisted by four astronomers, MU'AYYAD AL-DÎN AL-'URḌÎ, FAKHR AL-DÎN AL-MAGHRABÎ, FAKHR AL-DÎN AL-IKHLÂṬÎ, and NAJM AL-DÎN DAURÂN AL- QAZWÎNÎ. We know practically nothing about the buildings themselves and, by the way, our ignorance is not restricted to this particular observatory; we may say that in general we hardly know anything about the organization of Greek and Muslim observatories. It is true some slight knowledge might be derived from the study of the ruins of Marâgha, for I understand that the foundations

of the observatory are still extant (1). Thus far, however, our knowledge of the material organization of Greek and Muslim astronomy is restricted to the instruments.

The present paper, which we owe to a disciple of the much lamented EILHARD WIEDEMANN (1852-1927), contains abundant information on the instruments used at Marâgha. It does not include all the technical details with regard to their construction and their use which we would wish to have, and we are left in doubt on many points, yet it is exceedingly valuable. To appreciate its importance it will suffice to realize that with the exception of a few writings dealing with special instruments or devices (by AL-KHUJANDÎ, IBN SÎNÂ, IBN AL SHÂṬIR; and also in the *Libros del saber*) (2), this is the first Arabic or Muslim work of its kind. It is not only the first, but the most elaborate, and we have but three others, as follows: KHIYÂTH AL-DÎN JAMSHÎD IBN MAS'ÛD AL-KÂSHÎ wrote in 1444-45, in Persian, a short account of the instruments used at Samarqand; 'ABD AL-MUN'IM AL-'ÂMÎLI wrote in 1562-63, also in Persian, a description of the instruments used in Alexandria, Marâgha and Samarqand; the third account was written in Arabic by the Damascene astronomer TAQÎ AL-DÎN MUḤAMMAD IBN MA'RÛF, who died in 1585.

The anonymous account translated by SEEMANN was written by a contemporary of NÂṢIR AL-DÎN AL ṬÛSÎ, who was very familiar with the observatory. JOURDAIN, who published a French abbreviated version of the same account in 1809 (*Mémoires sur les instruments employés à l'observatoire de Méragha. Magasin encyclopédique*, vol. 6, 43), suggested that the author was probably MU'AYYAD AL-DÎN AL-'URḌÎ, one of the four astronomers above mentioned, — for the author was a Damascene, and this MU'AYYAD was the only Damascene among the four. This hypothesis has been adopted by the new editor, but he should have warned the reader at the very beginning of his memoir that the ascription to AL-'URḌÎ's autorship, however plausible, is uncertain.

The following instruments are described: 1. mural quadrant, 2. armillary sphere, 3. solstitial armil, 4. equinoctial armil, 5. HIPPARCH's diopter (alidade), 6. instruments with two quadrants, 7. instrument with two limbs, 8. instrument to determine sines and azimuths, 9. instrument to determine sines and versed sines, 10. the perfect instrument, 11. parallactic ruler after PTOLEMY. The instruments 9 and 10 are in reality trigonometrical instruments rather than astronomical ones. The translator has added many notes and excellent drawings which are a

(1) A. H. SCHINDLER, in *Zeitschrift der Gesellschaft für Erdkunde* (18, 338, 1883), quoted by SEEMANN, p. 116.

(2) For AL-KHUJANDÎ (second half of tenth century), see SARTON's *Introduction*, 667. For IBN SÎNÂ's « vernier », see *ibidem*, 710. IBN AL-SHÂṬIR died in 1375-76.

great help for the understanding of the text. His introduction contains additional information which would enable one to undertake a general study of Muslim astronomical instruments. The translation itself, with notes, covers 85 pages. It is followed by three short chapters dealing respectively with the significance of AL-'URḌÎ's descriptions, AL-'URḌÎ's life and writings, and the observatory of Marâgha. Finally an appendix is devoted to a brief analysis of another work, similar to AL-'URḌÎ's, the Persian treatise written by ABD :AL-MUN'IM AL-'ÂMILÎ in Ispahan 1562-63, and dealing with the instruments used in Alexandria, Marâgha and Samarqand. The unique Ms. of it — British Museum, Pers. Add. 7702 — contains many illustrations which are more carefully made than those of AL-'URḌÎ's work. However, it would seem that AL-'ÂMILÎ's treatise is essentially an elaboration of AL-'URḌÎ's.

SEEMANN's memoir is a noteworthy contribution to the study of Arabic astronomy. Our only regret is that he did not provide a glossary of the many technical terms mentioned in the text. The same author published a few years ago, with the collaboration of TH. MITTELBERGER, an equally valuable monograph on the spherical astrolabes described in the *Libros del saber* and in other Arabic writings (Erlangen, 1925; *Isis*, 8, 743).

GEORGE SARTON.

Georg Agricola. — ***Zwölf Bücher vom Berg- und Hüttenwesen in denen die Ämter, Instrumente, Maschinen und alle Dinge, die zum Berg- und Hüttenwesen gehören, nicht nur aufs deutlichste beschrieben, sondern auch durch Abbildungen, die am gehörigen Orte eingefügt sind, unter Angabe der lateinischen und deutschen Bezeichnungen aufs klarste vor Augen gestellt werden.*** Sowie sein ***Buch von den Lebewesen unter Tage.*** In neuer deutscher Übersetzung bearbeitet von CARL SCHIFFNER unter Mitwirkung von ERNST DARMSTAEDTER, PAUL KNAUTH, WILHELM PIEPER, FRIEDRICH SCHUMACHER, VICTOR TAFEL, EMIL TREPTOW, ERICH WANDHOFF. Herausgegeben und verlegt von der Agricola-Gesellschaft beim Deutschen Museum. XXXII + 564 p. folio. illus. Berlin, Verein deutscher Ingenieure, 1928.

Georgius Agricola. — ***De re metallica.*** Translated from the first latin edition of 1556 with biographical introduction, annotations and appendices upon the development of mining methods, metallurgical processes, geology, mineralogy and mining law from the earliest times to the 16th century, by HERBERT CLARK HOOVER and LOU HENRY HOOVER. XXXI + 640 p., London, Published for the translators by ***The Mining Magazine***, 1912.

Though AGRICOLA's masterpiece, the *De re metallica*, appeared only in 1556, it really belongs to the first half of the sixteenth century. It was a posthumous publication, for AGRICOLA (1494-1555) had been

dead four months when FROBEN issued it. AGRICOLA's first printed work dates from 1520. It was curiously enough a grammatical treatise, *Libellus de prima ac simplici institutione grammatica*. His first treatise on mining, the *Bermannus sive de re metallica* (not to be confused with the larger work) came out in 1530. This was followed by a whole series of other writings of scientific interest, — of which only two appeared in the second half of the century : a treatise on the plague (Basel, 1554) and the *De re metallica* (Basel, 1556). Of course, AGRICOLA's fame was largely based upon this the last of his works, but not by any means exclusively. The *Bermannus* was published seven times in Latin (1530 to 1657), once in Italian (1550), twice in German (1778, 1806). The *Libri quinque de mensuris et ponderibus* were published six times; the *De ortu et causis subterraneorum*, seven times in three languages; the *De natura fossilium*, five times; the *De veteris et novis metallis* five times; the *De animantibus subterraneis*, seven times; the *De peste*, three times. Thus, if the author had died before being able to complete his magnum opus, he would have been remembered by the many smaller works which the latter eclipsed.

The elaboration of the *De re metallica* occupied him for at least twenty years. Its success was considerable. The first edition of Basel, 1556 was followed by many others : Basel, 1561, 1621, 1657, and by translations into German, Basel, 1557, Francfort, 1580, Basel, 1621, and into Italian, Basel, 1563. It is curious that it was not translated into Spanish, for BARBA's Spanish work, *El arte de los metales*, appeared only in 1640 (*Isis*, 5, 232; 6, 162). AGRICOLA's treatise remained for almost two centuries the standard one on the subject, being finally superseded by the *Gründlicher Unterricht von Hüttenwerken nebst einem vollständigen Probier-Buch*, by CHRISTOPH ANDREAS SCHLÜTER (Braunschweig, 1738).

In spite of the existence of three other German translations, the publication of a new one, more scientific, is very welcome. The editors have added a translation of AGRICOLA's treatise on the creatures which live underground. The *De animantibus subterraneis* was first published in Basel, 1549; it was printed a second time together with the *De re metallica* and may be considered a sort of biological appendix to it. It was translated into Italian (1563) but the present translation is the first German one. It must be admitted that it does not show AGRICOLA at his best, for it is mainly an uncritical rehash of old stories. This illustrates once more a very common occurrence : a man may be critical and original in one field, and at the same time prove himself quite the opposite in another.

Some very good monographs on AGRICOLA and on the early mining literature (*Berg-, Probir-, und Kunstbüchlein*) had been published a few years ago by ERNST DARMSTÄDTER of Munich (1926; *Isis*, 10, 143-45)

and when I noticed his name among the many German scholars who contributed to this new edition, I felt that the undertaking was in good hands.

It is a splendid publication which reminds one at once of the English translation published by Mr. and Mrs. HOOVER in London, 1912. Same size, the two volumes look like twins. Of course, same illustrations, since both have simply reproduced the cuts used in the princeps of 1556. However, the German edition is undoubtedly more handsome: its paper is finer and its type more beautiful. The HOOVER volume is disappointing from the artistic point of view; and it does not include the *De animantibus subterraneis* (which is not a great loss). On the other hand, it contains more notes, to which Mr. HOOVER's mining experience gave special value.

When I was working at the War Office in London in 1914-15, I often passed near the offices of the *Mining Magazine* in Salisbury House, in the City, and used to stop at the window to examine a copy of HOOVER's book which was there exhibited. The price of it, thanks to the author's munificence, was extraordinarily low, but it was too high for my purse, and after a few looks at the impressive volume I had to move on without it! Who would have thought then that the author would become President of the United States, or rather more! For to be the incumbent of that high office is after all a smaller distinction, than to have been the leading spirit of the greatest relief organization of all times. Who ever played the Good Samaritan on such a gigantic scale? Though the ice of an American President is undoubtedly the highest and most responsible political office in the world, experience shows that it does not suffice in itself to confer immortality to its holders. How many of these does the world remember? We do not yet know whether Mr. HOOVER's administration of the United States will be memorable or not, but we do know that his administration of Famine Relief in Europe will ever be recalled as one of the finest achievements of its kind. But in 1912, when the OVERS revealed AGRICOLA to the English speaking world, these great events were still in the womb of time. Who could then have imagined the almost unconceivable opportunities which the War would open to a successful mining engineer and of his way of improving them? But the War, putting everything topsy-turvy, enabled us to make a few discoveries... Who would then have thought that the Austrian professor, THOMAS G. MASARYK, who was studying the Russian soul and trying to explain the antithesis, „Russia-Europe (*Isis*, 2, 238), would become the father, the George Washington, of a new country?

To return to AGRICOLA, there will be no excuse now for not knowing his work, for who does not read English or German? The Verein deut-

scher Ingenieure and the Deutsches Museum deserve our gratitude for this fine publication. GEORGE SARTON.

George Bruner Parks. — RICHARD HAKLUYT *and the English Voyages*, edited with an introduction by JAMES A. WILLIAMSON, D. Lit., American Geographical Society, Special Publication No. 10, New York, 1928. XVII + 289 pp.; 32 figs. (Five dollars).

« The Elizabethan Age was not spacious, as we are sometimes told, but narrow and needy. It was a time of industrious study of man and nature as well as of books, and its adventures were undertaken not from swashbuckling zest but because good men found their country in a tight place and staked their lives and fortunes to redeem it.... RICHARD HAKLUYT's epic is no paean of victory but a tribute to service and suffering; his heroes are not 'glorious' but 'worthy.' That is the best word he can bestow upon them. » Thus writes Dr. JAMES A. WILLIAMSON in his brilliant introduction to Dr. PARKS' book.

When we consider the inestimable debt that students of English and American history owe to what FROUDE called « the prose epic of the modern English nation »; when we consider that the author of this epic himself did not merely stand aside and record the story of English enterprise beyond the seas but played an active part in its promotion; finally when we consider that a great learned society devoted to the publication of early travel texts bears HAKLUYT's name, we are amazed that no one prior to Dr. PARKS has attempted a serious and prolonged study of RICHARD HAKLUYT. The bibliography of modern works of HAKLUYT is meagre, covering little more than a page in Dr. PARK's volume and including for the most part references to periodical articles dealing with points of detail.

Perhaps biographers have neglected HAKLUYT because detailed evidence regarding him is scarce. His personality did not impress his contemporaries in such a way as to leave a lasting mark upon the historical record. « The story of his career is the only story we really know in his long and active life. » Born probably in 1552, he took the degree of Bachelor of Arts at Oxford in 1574, was ordained sometime between 1578 and 1583, « was attached as chaplain to the English ambassador to France » between 1583 and 1588, became one of the canons of Bristol cathedral before 1587, was twice married, and died in 1616. His ecclesiastical duties were doubtless conscientiously performed, but as a means to an end. The first outstanding event in his career was a visit at the age of sixteen to an elder cousin, RICHARD HAKLUYT, lawyer of the Middle Temple, on whose table, the younger RICHARD writes, « I found lying open ... certain books of cosmography, with an universal map : he seeing me somewhat curious in the view thereof, began to instruct my ignorance »

and thus lit a fire that burned for nearly fifty years. « From childhood HAKLUYT... 'waded in the sweet study of the history of Cosmography'. » The elder RICHARD, whose inspiration led his cousin so to « wade, » « gathered other men's experience, especially in economic geography and, having gathered it, retailed it as a kind of consultant, » and it was as such a « consultant geographer » that the younger man later served, becoming, thereby, actively associated with the promoters of the Virginia colony and of English trade with India.

The culminating point of HAKLUYT's life was, as we all know, the publication of that monumental work of nearly 1,700,000 words, *The Principal Navigations, Voyages, Traffics, and Discoveries of the English Nation*, (or, for short, *The English Voyages*) which appeared first in 1589 and in its final form in three volumes in 1600.

Although the *Voyages* reveal HAKLUYT as, par excellence, a compiler, editor, and archivist, and not as a creative genius, he was animated with the scientific spirit. His aim was to obtain and publish original documents. Systems of universal cosmography « being most untruly and unprofitably amassed and hurled together, » held no interest for him. In the search for first-hand information either in manuscript or from the mouths of travelers he spared no effort, and he maintained a rigorous standard in printing these records. He presented the documents in full, not, as his predecessor G. B. RAMUSIO (1485-1557) often did, in « boiled-down » form. Nor was HAKLUYT content to include narratives of travel alone. The *English Voyages* are more than a compendium of historical sources; they are a « geographical description of the new worlds now fully opened by the English, » and as such they include material bearing on questions of mathematical and economic geography, tables of distances, trade memoranda, etc. « If we can hardly measure HAKLUYT's merits as a geographer (because he produced no systematic treatise on the subject) we can at least praise him as an editor. The work he did was immense. In his own books and in the books which he brought to print in English he was editing a great geographical library... He was a geographical society in his own person. »

Besides throwing as much light, perhaps, as can be thrown upon the work of the two HAKLUYTS, Dr. PARKS gives us a splendid survey of the rise of geographical interests in England during the sixteenth century. He shows how intimately scientific development in this direction was associated with the expansion of maritime enterprise and with the growing stature of England as a nation. In the Elizabethan Age geography was far from being exclusively academic. Mathematical geography, through its contribution to the art of navigation, enabled the merchant adventurers to work out what PARKS calls « the tactics

of overseas enterprise »; and commercial geography did the same for the « strategy of enterprise. »

Richard Hakluyt and the English Voyages is an important contribution to our understanding of the Elizabethan Age. What is more, it is a delightful book to read. Dr. PARKS writes spiritedly, and nearly every page is enlivened with an apt turn of phrase. The illustrations, reproductions of sixteenth century maps, prints, title pages, and manuscripts, are well selected and add to the attractiveness of the volume.

J. K. W.

Johannes Kepler. — *Neue Astronomie.* Übersetzt und eingeleitet von MAX CASPAR. 416 p., XIII + 68 fig. München, R. OLDENBOURG, 1929 (Gebunden, Mark 38.50).

This German translation of one of the foremost classics of astronomy, the *Astronomia nova* (1609) will be very welcome not only to German scholars, but also to the many Englishmen and Americans who read German more easily than Latin. The same author had given us a few years ago (Augsburg, 1923) a translation of KEPLER's *Mysterium cosmographicum* (*Isis*, 6, 163). That Pythagorean work had been published by KEPLER at the age of twenty-five (in 1596), and though he never disavowed it (he published a revised edition of it in 1621 and remained a Pythagorean mystic to the end of his days), his knowledge and his grasp of physical realities had increased enormously in the meanwhile. The *Prodromus* or *Mysterium* is of great archaeological interest, but the *Astronomia nova* marked the beginning of modern astronomy. A deep study of the orbit of Mars had led KEPLER gradually to the conception that the planets move in elliptical trajectories. The *Astronomia nova* contained also the first statement of the law of equal areas; but the third law — the sesquiplicate ratio between the planetary distances and periods — was not published by KEPLER until ten years later, in his *Harmonices mundi libri* V (1619).

The German translation is preceded by a long introduction dealing with the theory of planets before KEPLER, the elaboration of the *Astronomia nova* and its composition. The author has taken special pains to make KEPLER's thought as intelligible as possible. In short, thanks to his devotion, it is now possible to read this great classic with comparative ease. The typographical execution is splendid, in every way worthy of the work itself, one of the greatest in the whole experience of mankind.

G. S.

Robert Theodore Gunther. — *Early Science in Oxford.* Vol. IV. The Philosophical Society. VIII + 259 p., 4 illus. Oxford, Printed for the subscribers, 1925.

The author of this volume, who might be called *the* historian of Oxford science, is too well known to our readers to need any introduction. Many publications of his were reviewed in our columns, notably the Daubeny Laboratory Register, Oxford, 1904-24 (*Isis*, 7, 561; 11, 481) and the first three volumes of *Early Science in Oxford* (1920-25; *Isis*, 6, 449-53; 8, 375-77).

The present volume deals exclusively with the « experimental philosophicall clubbe » — formally called The Philosophical Society of Oxford (also the Invisible College), which owed its inception, c. 1648, to Dr. JOHN WILKINS, Warden of Wadham College, and to other Oxford friends of the « New Philosophy ». The arrival of ROBERT BOYLE in Oxford in the summer of 1654 in creased its importance. « After the Restoration (1660), the Society divided. Several of the most prominent members withdrew to London, where they joined the professors at Gresham College, meeting there with other inquisitive persons after the astronomy and geometry lectures on Wednesdays and Thursdays in term time. Determined to keep their company select, the members of the London branch limited their numbers to fifty-five, « except such as were of, or above, the degree of Baron. » The King was understood to approve of their meeting, and BOYLE, WREN and ASHMOLE were all in the first list of members. On July 15, 1662, they received a charter incorporating them under the title of The Royal Society. » Yet this was not the end of the Oxford group. At the time of the Great Plague, the London meetings were discontinued, and the Oxford meetings in BOYLE's rooms were unusually well attended. During this short period (1665), three numbers (6 to 8) of the Philosophical Transactions were printed in Oxford. In 1666, the London meetings were resumed, but the Oxford ones were apparently continued. However, the activity of the Oxford group was better known by the communications of its members to the Royal Societan by its own meetings.

When the Royal Society celebrated its fifth jubilee in 1912, it formally acknowledged its debt to the parent organisation by making a pilgrimage to Oxford and to Wadham.

The present volume contains the Transactions of the Philosophical Society of Oxford, from October 26, 1683 to June 3, 1690, printed for the first time from an Ashmolean manuscript. An elaborate index will make it easy to refer to them. The book will be indispensable to students of the second half of the seventeenth century, a period of special significance to us, since it witnessed the birth of modern science.

G. S.

Florian Cajori. — *The chequered career of* FERDINAND RUDOLPH HASSLER, *first superintendent of the United States Coast Survey*. A chapter

in the history of science in America. 245 p., 3 fig., illus. Boston, Christopher Publishing House, 1929 ($ 2).

Though the United States is a very large country, and Switzerland, a very small one, the former owes much to the latter. At least four great Americans were of Swiss origin. I name them in chronological order : ALBERT GALLATIN, F. R. HASSLER, LOUIS AGASSIZ, and ARNOLD GUYOT. The second of these is perhaps the least known, outside of a small circle of specialists, and thus the publication of this biography is especially welcome. Dr. CAJORI had been thinking of him for many years, witness his paper of 1921, entitled *Swiss geodesy and the United States Coast Survey* (*Isis*, 4, 419), which was, to me at least, the first revelation of HASSLER's admirable activity and heroic life.

In the preparation of this book, the author has used not only HASSLER's scientific writings and brief autobiography, and the materials published at Nice in 1882, but also a number of unpublished documents. He has thus been able to give us a good portrait of this remarkable man, to whom American science owes far more than is generally recognized. To use CAJORI's own words « A man of great practical ability as a scientist, but of scant practical ability in the art of easy and comfortable living, a man highly trained in mathematics, yet a mere child in every-day economics, a man lacking the training of the ordinary politician, yet able by his earnestness and sincerity to influence public opinion, a true scientist ambitious for the highest standards of scientific achievement and never willing to surrender them to the pressing demands of temporary expedience, — such a man was FERDINAND RUDOLPH HASSLER. This rugged figure commands a conspicuous position in the early history of science in America, as the organizer and first superintendent of the first great scientific bureau of the United States ».

Let me just recall the main facts of his life. FERDINAND RUDOLPH HASSLER was born at Aarau, in German Switzerland, in 1770; he emigrated to the United States in 1805, was professor at West Point and Union College (Schenectady), and took a leading part in the creation of the Coast Survey and of the Bureau of Weights and Measures; he wrote a number of textbooks, and died at Philadelphia in 1843. He was not a creative genius; he invented nothing new except minor modifications of geodetic instruments, but he stands out greatest « in perceiving what was best in the practical geodesy of his time, in making improvements upon what he found, and then clinging to the triangulation scheme that he had initiated as being the best that the science of his day had brought forth, — clinging as a mother does to her child in danger. What looms highest is his moral quality and strength to resist compromise, to oppose suggestions of alterations, made by engineers and statesmen, to maintain this opposition against the adoption of 'cheaper' yet 'just

as good' plans, and to persist in this opposition year after year, decade after decade, from young manhood to old age. »

The best way to give additional information on this book as well as on HASSLER's life, is to quote the titles of the chapters. At the same time this will clearly show that this biography is a valuable contribution to the studv of scienitfic life and scientific organization in America in the first half of the nineteenth century : HASSLER's education in Switzerland, his travels in Europe and arrival in Philadelphia; first organization of the United States Coast Survey in 1807; HASSLER, professor at West Point, 1807-1809; HASSLER, professor at Union College, 1810-11; HASSLER's mission to England and France; beginning of the U. S. Coast Survey, 1816-1818; survey of the northeast boundary line between United States and Canada; description of the plans and instruments for the United States Coast Survey; the dark age of the United States Coast Survey, 1818-1832; HASSLER's years of stress and struggle in untried fields of activity, 1819-1830; HASSLER superintendent of the United States Weights and Measures; renaissance of the U. S. Coast Survey, 1832-1843; HASSLER's eleven years' struggle with secretaries and auditors, and with Congress, 1832-1843; HASSLER's death. Estimates of his services.

I should have liked to see at the end of this volume a complete bibliography of HASSLER's published and unpublished writings in chronological order. It seems incomplete without it. Moreover such a list would give us another means of visualizing and measuring HASSLER's activity, and enable us to check chronological facts. *The Popular Exposition of the System of the Universe* was published not in 1830, as is said on p. 145, but in 1828. GEORGE SARTON.

Kubitschek, Wm. — *Grundriss der Antiken Zeitrechnung*. IX + 232 pp. illus. Beck'sche Verlagsbuchhandlung, München, 1928. (16 Marks, bound).

WALTER OTTO's new edition (recast) of IWAN VON MÜLLER's *Handbuch der Altertumswissenschaft* receives a valuable instalment to the first « Abteilung » in Prof. KUBITSCHEK's « Outlines of the Chronology of Antiquity. » That notable Chronologist, G. FR. UNGER, had supplied the « Outlines » of editions one and two in 1886 and 1892 (120 pp.); but having died in 1906, he was succeeded by as able a person for the present issue of quite a new work embodying the progress of thirty seven years... These « Outlines » are mainly devoted to Greek and Roman chronology through the centuries with sufficient Egyptian preliminaries. Babylonian astronomy and astrology are subjects scarcely broached, our author preferring to stress the dependence of the West in chronology on the Nile-land. Oldtime eras about the Mediterranean basin are also booked; whereupon with a study of day and night divisions the author leads

up to sundials and clocks. The whole concludes with very handy tables of Olympiads from the beginning, continued yearly with Egyptian new-year date, date B. C., taking in A. U. C. later and then again the Seleucid era in columns running parallel, the whole being continued till 395 A. D.. The « Nachträge » appended deal with literature till 1927 inclusively. The whole is beautifully printed.

The ground covered is thus very ample, and while the beginner in chronology is like to set down the book in despair after some 15 pages read, we are convinced that the student already acquainted with this debatable land will peruse the work and refer to it with pleasure and profit. The Professor, we imagine, is here addressing not so much his disciples as his fellow-chronologists. Only these will take in the acute remarks on the philosophy of time-reckoning that here abound; a wider circle will appreciate the flashlights on the history of this science. As to the findings of chronology, the determining of dates, synchronisms and the valuation of inscriptions, our author is so extremely cautious that one detects a pessimistic vein in him, that leads him to hold apparently little else as well established till the date of Actium and the Julian calendar (pp. 2, 3, 19, 126). This will do more than make the beginner prudent, it will discourage him. The initiated on the other hand will value the terse exposition of difficult systems, e.g. the era of Nabonassar, Seleucid-era (with valuable — yet again sceptical ! — additions in the «Nachträge»); Egyptian and Macedonian months (diagram); further the old solar year of Italy, the Calendar of Coligny and a hundred other phases of chronology. The varied tables printed in whole or as specimina really are representative. Thus the book (which in English print would run into nearly 400 pages) is full of good data and of references made *ex abundantia*. One regrets the more the want of coherence of the various parts. Thus what can be the *esprit de suite* in these sections : sec. 33 Gregorian reform; sec. 34 Easter reckoning (from the beginning !); sec. 35 Old Italian solar calendar; sec. 36 Jewish reckoning (Old Testament); sec. 37 Roman Calends etc.? Thus, as each section is brilliant, we have many bright stars — but no constellation; many plums, but no pie. We note but few other defects : thus the failure of any eclipse data; the rating of GINZEL's wonderful volumes as merely a new edition of IDELER, and the too little use made of MAHLER « Handbuch der jüd. Chronologie » (1916). There is an unfortunate slip on p. 62. The last year of PTOL. EPIPHANES is not 180 but 181 B. C. The date of his successor's accession (PTOL. PHILOMETOR) must also be put back one year. The note on the same page concerning BALTHASAR is quite inadequate and misleading; cf. *Biblica*, 1928, 187-205.

H. G. BÉVENOT.

Cyril Bailey. — *The Greek atomists and Epicurus.* VI + 619 p. Oxford Clarendon Press, 1928 (24 s.).

The author of this volume, who gave us not long ago a new edition of the Epicurean remains (1926; *Isis*, 10, 106), is now completing his former work by this very careful and conscientious study of Greek atomism and Epicureanism. His study is divided as follows : 1. Antecedents of atomism (55 p., plus an appendix of 20 p. on ANAXAGORAS). This is in effect a brief history of early Greek philosophy from his special point of view. In our opinion, an outline of Pythagorean doctrines ought to have been included; 2. LEUCIPPOS (45 p.); 3. DEMOCRITOS (106 p.); 4. EPICUROS (318 p., plus 38 pages of appendixes dealing with technical points). It will be seen that more than half of the whole work is devoted to EPICUROS, which is not surprizing considering the abundant information to be obtained in the master's extant writings and also in LUCRETIUS.

The treatment is distinguished throughout by extraordinary lucidity and by faithfulness to the authentic texts available. Philosophers have but too often been tempted to read far more in these texts than was justified, and to give us a picture of atomism and Epicureanism which was more or less colored by later philosophical views or by the scientific discoveries of our own time. Under the author's guidance we feel very safe. Indeed the relevant texts are always quoted and thus we are able to check his every statement and draw our own conclusions.

The first result of his study is to make us realize more keenly the material difference between LEUCIPPOS and DEMOCRITOS. These two philosophers are too often linked without discrimination, the discovery of the whole doctrine being credited to both. To be sure H. DIELS's Fragmente contained many texts referring to LEUCIPPOS alone, but historians of philosophy had not paid sufficient attention to them. BAILEY makes a very clear distinction between the two men. LEUCIPPOS was the pioneer (c. 430) whose task was chiefly one of mediation between the Eleatic Monism of the successors of PARMENIDES and the Pluralism of EMPEDOCLES and ANAXAGORAS. A little later (c. 420), his disciple, the cheerful DEMOCRITOS, completed the elaboration of atomism. DEMOCRITOS was a true encyclopaedist who developped LEUCIPPOS's intuition into a systematic philosophy.

One wonders how much Greek atomism owed to oriental hints. The author does not go very deeply into this fascinating question, but his conclusion may be quoted. After showing the essential differences between Vaiçesika and Greek atomism, he says (p. 65) : « All these differences make the suggestion of borrowing improbable : moreover, the latest writer (1) on the subject is not inclined to put the Indian works

(1) A. B. KEITH : Indian logic and atomism (1921, 17).

as early as previous scholars had done, and states that there is no proof of the atomic doctrine of India until after contact with the Greek kingdom of Bactria. He even discusses the question whether the Indian doctrine is derived from the Greek, but admits elsewhere that the works as we have them presuppose much previous discussion. If there was then an old atomic tradition in India, it may be that some inkling of it had penetrated to Greece, either, as the legend of 'Mochus' would suggest, by way of Phoenicia, or possibly through the Ionian colonies, but there is certainly no reason for supposing that LEUCIPPUS owed any direct debt to it, or that he is other than an 'original' thinker in the sense that he evolved his Atomism for himself as the direct outcome of the theories of his Greek predecessors. » Speaking of Oriental influences, it is told of DEMOCRITOS that he visited Egypt, Persia, and India, and conversed with the « naked philosophers ».

I may still quote the author's statement of DEMOCRITOS's theory of knowledge (p. 185): « He was neither a sceptic nor a rationalist, nor a phenomenalist, he does not fit into any of the modern categories; he neither denied nor affirmed the truth of *all* sensation nor of *all* thought; but built up for himself a 'theory of knowledge', subtle and almost paradoxical, but based directly on his atomic conception of the world. The final realities of the universe, the atoms and the void, are real and are capable of being known by the mind. Phenomena are built up of the final realities and retain the primary properties of size and shape: as such they are real and can be known by the senses. The mind may safely make its deduction from phenomena, both because the phenomenon as a unity of these primary properties is real and because sensation — the mere perception of the real phenomenon — is the same as thought. But once go beyond these primary properties, beyond the reality of the phenomenon, and you are attributing to the object what is really the subjective experience of your senses, and thought based on those 'conventions' will lead you nowhere. »

EPICUROS is much better known than the earlier philosophers and the author is able to draw a portrait of him which is almost life-like, and which suggests comparisons with living philosophers of our own acquaintance. His doctrine is also more familiar, if only because of the *De natura rerum*, which was on the whole a very faithful explanation of it. Says BAILEY: « Although there may be places where LUCRETIUS has not fully comprehended its meaning, it is exceedingly improbable that he has at any point introduced notions or developments of his own. » However, Epicureanism is very different from Atomism, the emphasis being now transferred from physics to ethics. Its most pleasant feature to the modern scientist is its hatred of superstition, a hatred which it is his sacred duty to keep alive.

Among the many appendices dealing with special questions, I would draw attention to the fourth, on ὄγκος, cacumen and glomeramen. The author rejects CARLO GIUSSANI's interpretation of these terms as « molecule ».

The statement (on p. 1) that « atomism was totally eclipsed throughout the Middle Ages by the physical speculations of ARISTOTLE » is far too sweeping. To begin with the very fact that we have two excellent ninth century Mss. of the *De natura rerum* does not suggest that atomism was ignored. A number of mediaeval authors speak of it. Moreover some of the Muslim philosophers not only understood that doctrine but elaborated it in a very original way, and conceived a sort of atomic time. See D. B. MACDONALD : Continuous re-creation and atomic time in Muslim scholastic theology (*Isis*, 9, 326-44, 1927); G. B. STONES : The atomic view of matter in the fifteenth, sixteenth, and seventeenth centuries (*Isis*, 10, 445-65, 1928).

The Greek index at the end of the book will be very useful. To sum up, this is an excellent contribution to the study of Greek philosophy and Greek science. GEORGE SARTON.

Bernhard Rathgen. (1847-1927). — *Das Geschütz im Mittelalter.* XIX + 718 p., 16 pl., quarto. Berlin, Verein deutscher Ingenieure, 1928.

This splendid publication is a worthy monument to the author's memory. BERNHARD RATHGEN was born in Copenhagen in 1847, but his family having moved to Kiel and Berlin he was educated in Germany. He becamed an artillery officer in the German army, reaching the rank of lieutenant general. He died at Marburg a.d. Lahn in 1927. In spite of his abundant professional duties, he found time throughout his life for historical investigations. These historical tendencies may have been due to the fact that he was a grandchild of BARTHOLD GEORG NIEBUHR (also a son of Copenhagen); they were intensified by his friendship with HERMANN VON MÜLLER, author of a « *Geschichte des Festungskrieges* » (1892). The study of the history of arms, and especially of firearms, became gradually the main interest of his life. From 1901 on he published a number of papers on this subject, mainly in the *Zeitschrift für historische Waffenkunde*. Though he had received no special training in that direction, his sound historical instinct made him soon realize the essential need of archival investigations. Indeed the original accounts are by far our best witnesses to determine the progressive use of firearms in various localities, and RATHGEN examined a great many of these with extraordinary zeal and intelligence. Moreover his technical experience, as an artillery officer, stood him in good stead to interpret these documents with a full understanding, not simply of the words, but of the realities involved.

To return to his magnum opus, it is divided in four parts : A. Firearms in Francfort; B. Firearms in other German localities; C. Firearms outside of Germany ; D. Other arms which were gradually displaced by the firearms.

Though this subdivision of the subject is perhaps not the best one from a purely logical point of view, it is a very natural one. A deep study of the Francfort archives from 1348 to 1440 gave him an intimate contact with the problems to be investigated. Francfort proved to be an excellent starting point. True it is that the earliest German account of firearms is not found in Francfort but in Aachen (1346. *Item pro una busa ferrea per sagittandum tonitrum*); yet the Francfort accounts prove that that city used already firearms in 1348, and that in the following year a great many of these were already available. It is thus possible that firearms were used in Francfort earlier than in Aachen. RATHGEN was much struck by the fact that the technical names found in these early accounts are purely German : Büchse, Geschütz. Moreover the older Francfort Büchsen were cast in bronze, while the older foreign bombards were forged in iron. The author came gradually to the conclusion that firearms were invented in Germany, and his patriotic wish to give the world this additional proof of the technical genius of his people stimulated him in the course of his painstaking research. I must say that he has not proved this case, nor could anything of the kind be proved by his method unless it were extended to many countries. All that we know is that sometime in the third decade of the fourteenth century the motive power of gunpowder was discovered and firearms provided with locks were invented. It matters but little where the invention was made. As the idea had then been in the air for many years, it is possible, nay probable, that the invention was made in more than one place and that it was realized in more than one way.

I have no time to follow the author in all the intricacies of his immense subject, nor is it necessary. It will suffice to warn the reader in a general way that this great work contains an immense amount of material dealing with the history of firearms (and to a smaller extent of other arms) in the fourteenth and the first half of the fifteenth century. The archival sources are generally quoted in full. For Francfort, the author was naturally able to avail himself of the investigations of G. F. KRIEGK (d. 1878) and for Burgundy of the admirable work of J. GARNIER : *L'artillerie des ducs de Bourgogne* (Paris, 1865), but he examined most sources with his own eyes. His study of foreign countries was restricted to Switzerland (1384-1445), Burgundy (1362-1450), Spain and Italy. That part of his work is of course far more superficial than the one dealing with Francfort or with other German towns. I read with special curiosity his account of the Faule Grete, of the Dulle Griet of Ghent, the Holle

Griet of Diest, and other mediaeval monsters. Interesting comparative tables will be found on p. 498 and following. A final chapter (LV) deals with the beginnings of the use of firearms in various countries; part of it is devoted to a discussion of G. KÖHLER's argument against the German origin. General RATHGEN, who was equally convinced of the superiority of the German genius and of the fact that « Die Waffe ist der Ausgangspunkt aller Kultur » (p. 665), was especially anxious to prove the reality of this German invention. If according to him, the three fundamental inventions were (the military use of) gunpowder, printing, and the steam-engine, two of these might then be credited to his adopted country !

The work is fittingly completed by a chronological table from palaeolithic times to 1450, and by 16 plates including portraits of the author and of his master, HERMANN VON MÜLLER.

The Verein deutscher Ingenieure and its director, CONRAD MATSCHOSS, deserve congratulations for their share in this outstanding publication.

GEORGE SARTON.

Gabriel Ferrand. — *Introduction à l'astronomie nautique arabe* (Bibliothèque des géographes arabes, vol. 1). XII + 272 p., 25 fig. Paris, GEUTHNER, 1928 (100 frs.).

I have already spoken of the new collection edited by GABRIEL FERRAND apropos of the second volume containing a French translation of IBN FAḌL ALLÂH AL-'UMARÎ : *Masâlik al-abṣâr* (Paris, 1927; Isis, 12, 358). The first volume is a reprint of vol. 3 of FERRAND's *Instructions nautiques et routiers arabes et portugais des XV^e et XVI^e siècles* (*Isis*, 5, 504). It is dedicated to the memory of the much lamented LÉOPOLD DE SAUSSURE (1866-1925), which is a little strange considering that the lion share of it was contributed by de SAUSSURE himself ! This volume contains five memoirs, three of which had been printed before :

(1) JAMES PRINSEP : Note on the nautical instruments of the Arabs (*Journal of the R. Asiatic Soc. of Bengal*, 1836).

(2) Captain H. CONGREVE : A brief notice of some contrivances practiced by the native mariners of the Coromandel coast, in navigating, sailing and repairing their vessels (*Madras journal of literature and science*, vol. 16, 101-104, 1850).

(3) LÉOPOLD DE SAUSSURE : L'origine de la rose des vents et l'invention de la boussole (*Archives des sciences physiques et naturelles*, vol. 5, Genève, 1923; *Isis*, 6, 208).

(4) L. DE SAUSSURE : Commentaire des Instructions nautiques de IBN MÂJID et SULAYMÂN AL-MAHRÎ. This memoir was left incomplete by the author's death. It is a scientific discussion from the navigator's point of view of the Muslim manuals edited by FERRAND.

(5) G. FERRAND : Les mu'allim IBN MÂJID et SULAYMÂN AL-MAHRÎ. A fundamental study.

Though the editor, whose name is the only one to appear on the cover, contributed less than half of this volume, it must be said that he added notes to the other papers, a preface including a biographical sketch of DE SAUSSURE, and a brief glossary. Students of Arabic astronomy and navigation will be glad to have all these papers (two of which are almost impossible to obtain in the original editions) in a single volume. They will have to refer to it, e.g., for the correct understanding of such technical terms as iṣba', dhubbân, tirfâ, bâshî.

However, the title of this book is a little misleading. It is not really an introduction, but a collection of materials for such an introduction. The editor has done only half of his task. This is the more true, if one considers that some of the views defended by LÉOPOLD DE SAUSSURE are highly speculative. A real introduction to Arabic nautical astronomy remains to be digested and to be written.

At a time when most scholars try to reduce as much as possible the bulk of their libraries, it seems a pity that the size of this volume should be artificially increased by the use of especially thick paper. This childish trick is unworthy of as great a publishing house as the house of GEUTHNER. G. S.

José A. Sánchez Pérez. — *Las matemáticas en la Biblioteca del Escorial.* Obra premiada por la Real Academia de Ciencias Exactas, Fisicas y Naturales de Madrid. 365 p., 61 pl. Madrid, Imprenta de Estanislao Maestre, 1929.

The author of this most interesting catalogue of the mathematical books and manuscripts kept in the Escorial is well known to our readers. Three other publications of his have already been brought to their attention : ***Partición de herencias entre los Musulmanes del rito malequi.*** Con transcripción anotada de dos manucritos aljamiados (328 p., Madrid, 1914; *Isis*, 10, 250). *Compendio de álgebra de* ABENBÉDER. Texto árabe, traducción y estudio (196 p., Madrid, 1916; *Isis*, 4, 509). ***Biografías de matemáticos árabes que florecieron en España*** (164 p., Madrid, 1921; *Isis*, 4, 537).

The present work, though more general in scope, belongs in fact to the same series, for the Escorial library is especially rich in Spanish works. This catalogue is thus an indispensable tool for the study of Spanish mathematics.

It was a very good idea to list books and manuscripts in a single series. The arrangement is according to the alphabetical order of authors' names, but scholars will do well to examine the whole catalogue, otherwise they are likely to overlook some important items. To begin with, anonymous

works are classified under their own titles or under general headings such as : historia de la astronomía, de las matematicas y de la nautica; calendario; relojes de sol (sundials), etc. In the second place, the Spanish transcription of Arabic names is as usual very peculiar; for example, JÂBIR IBN AFLAH of Seville is classified under Chĕber Benaflah al-Ixbili. Finally the author has added some eccentricities of his own; for example, ISIDORE OF SEVILLE and JOHN OF DAMASCUS are classified under San Isidoro and San Juan as if the word San (Saint) belonged to their name !

The bio-bibliographical notes are very unequal in length but many of them (chiefly those devoted to Spanish mathematicians) contain interesting remarks which will induce us to consider the subject from a new angle. No English scholar will peruse them without learning a number of new facts. For example, did you know that Sister MARIA DE JESUS OF AGREDA (1602-65) composed an astronomical treatise? There is a contemporary manuscript of it in the Escorial entitled « Tratado de la mapa y discrezion vrebe de los orbes zelestiales i elementales desde el zielo Impirio asta el zentro de la Tierra. Tratado de la redondez de la tierra y de los Abitadores de ella y lo que en si contiene. »

The illustrations are especially valuable. They include many portraits of distinguished Spaniards, title pages of outstanding works, etc. No less than 13 plates are devoted to the *Astronomicum Caesareum* which PETER APIAN published at Ingolstadt in 1540, and which was illustrated by means of articulate and movable models.

There is no index but the author has added a number of lists which will enable readers to find out promptly all the material concerning a certain subject, e.g., algebra, arithmetic, astrolabe, astrology, astronomy, cartography, comets, eclipses, metrology, tables of logarithms, etc. It is a pity that he did not think of adding also a chronological synopsis.

It may be worth recalling that the Escorial Library was founded in 1575 by PHILIP II, the first nucleus being a collection of 4000 books taken from his own library. It was rapidly increased by the addition of many other collections. Later a royal decree ordered the sending to the Escorial of a free copy of every book published in the Spanish Dominions. Unfortunately, the Library was partly destroyed by a fire in 1671, and many treasures were stolen in 1809 by the French invaders. In spite of these calamities and other vicissitudes the Library is exceedingly rich; it contains about 140,000 books and 5,000 manuscripts.

G. S.

Florian Cajori. — *A history of mathematical notations*. Vol. 2. Notations mainly in higher mathematics. XVII + 367 p., 20 fig. Chicago, Open Court, 1929 (vol. 2., $ 6; the 2 vols., $ 12).

A long review was devoted to vol. 1 of this great work (*Isis*, 12, 332-

36), and what we said of it — our praise of it — applies *mutatis mutandis* to the second volume. It will thus suffice to give the contents of this volume.

It is divided into four main parts: 1. Arithmetic and algebra; 2. Analysis; 3. Geometry; 4. Generalizations and conclusions.

A further analysis will give the reader a more definite idea of the field covered by the author and of the abundance of information which his book contains.

I. *Arithmetic and algebra*: Letters representing magnitudes; The letters π and e; The evolution of the dollar mark; Signs in the theory of numbers; Signs for infinity and transfinite numbers; Signs for continued fractions and infinite series; Signs in the theory of combinations; Determinant notations; Signs for logarithms; Signs of theoretical arithmetic; Symbolism for imaginaries and vector analysis.

II. *Modern analysis*: Trigonometric notations; Survey of mathematical symbols used by LEIBNIZ; Differential and integral calculus; Finite differences; Symbols in theory of functions; Symbols in mathematical logic.

III. *Geometry*: Recent geometry of triangle and circle, etc.; Projective and analytical geometry.

IV. *The teachings of history*: The teachings of history as interpreted by various writers, individual judgments; Empirical generalizations on the growth of mathematical notations; Co-operation in some other fields of scientific endeavor, electric units, star chart and catalogue; Group action attempted in mathematics, in vector analysis, in potential and elasticity; in actuarial science; Agreements to be reached by international committees the only hope for uniformity of notations.

The author and publishers deserve warm congratulations for the completion of this great task. CAJORI's History of notations will remain a standard work for many years to come. It ought to be given a place of honor in every mathematical library. G. S.

Harlow Shapley and **Helen E. Howarth.** — *A source book in astronomy.* XVI + 412 p., illustrated. New York, MCGRAW-HILL Book Company, 1929 ($ 4).

This is the first to appear of the much heralded series « Source books in the history of the sciences », conceived and edited by GREGORY D. WALCOTT, of the Long Island University, Brooklyn, N. Y. To appraise correctly such a work,we must first of all make a statistical analysis of it. Let us examine roughly (1) how the different periods, and (2) how the different countries are represented in it.

Before answering the first question it must be said that according to the general plan of this series, the source books do not go beyond

the sixteenth century. This is grotesque, of course. It is as if the editor of a collection of biographies had decided that each biography would begin with the twentieth or the twenty-fifth year, the history of childhood and youth being considered irrelevant. If it had been decided to deal with ancient and mediaeval times only in a very brief manner, I could have understood that, but not to speak of them at all — to start as in this volume, abruptly, with COPERNICUS — is almost unforgivable. However, the editors of this particular volume can hardly be blamed for this. It is the general conception which is in this respect fundamentally unsound.

(1) Let us now answer the first question. The figures in the first column represent the number of astronomers of each period quoted in this volume; the figures of the second column represent the number of pages devoted to them (roughly, illustrations and blank spaces being included).

sixteenth century (first half)	1	12
(second half)	1	7
seventeenth century (first half)	4	43
(second half)	5	32
eighteenth century (first half)	3	22
(second half)	8	63
nineteenth century (first half)	14	78
(second half)	29	145
	65	402

This seems to be on the whole a good distribution. The peak in the first half of the seventeenth century is due to KEPLER and GALILEO. One is a little surprized by the minimum in the first half of the eighteenth century; a minimum which would not have appeared if the authors had considered the astronomical work done outside of England during that period and had spoken, e.g., of CLAIRAUT and of D'ALEMBERT. It would have been very logical to introduce the latter in order to complete the account of nutation given by BRADLEY. BRADLEY discovered nutation experimentally; D'ALEMBERT gave the mathematical theory of it.

(2) Let us now consider the second question. The figures of the first and second columns have the same meanings as before : numbers of astronomers, and numbers of pages devoted to them. The nationalities are mentioned in the order of their importance according to the second column.

1.	English	21	132.5
2.	German	14	91.5
3.	American	13	67
4.	Italian	6	36.5

5.	French	4	33
6.	Russian	2	12
7.	Polish	1	12
8.	Scandinavian	2	9
9.	Dutch	2	8.5
		65	402

Poland is represented here by COPERNICUS, but whether COPERNICUS ought to be called a Pole or a German, is a moot question, not so easily settled as the authors imagine (see *Isis*, 5, 222; 8, 546). Switzerland was left out because the authors did not think it worthwile to mention EULER... However, the most striking facts of this distribution, is the large space given to America, and the small one to France. I have counted the elder CASSINI and LAGRANGE as Italians, the latter was associé étranger of the Académie des sciences; if I have counted them as Frenchmen, the figures relative to France and Italy would have become respectively 6 and 37 (instead of 4 and 33), and 4 and 32.5 (instead of 6 and 36.5) and the order of these countries would have been reversed.

SHAPLEY and HOWARTH discovered as many astronomers deserving mention in the United States, as in Italy, France, Russia, and Poland combined, and they gave almost as much space to America as to Italy and France combined! Is this a fair selection? To illustrate how unfair it is, I shall name (1) the American astronomers selected by the authors, (2) a few of the European astronomers whom they did not care to mention. The comparison of these two lists will be instructive.

(1) *Americans included.* GEORGE PHILLIPS BOND, DANIEL KIRKWOOD, JAMES LICK, CHARLES AUGUSTUS YOUNG, ASAPH HALL, BENJAMIN APTHORP GOULD, SIMON NEWCOMB, SAMUEL PIERPONT LANGLEY, GEORGE WILLIAM HILL, EDWARD CHARLES PICKERING, SETH CARLO CHANDLER, PERCIVAL LOWELL, JAMES EDWARD KEELER. To be sure, some of these names are illustrious ones; but others are not and would not be identified at once, even by American astronomers. In one case at least the choice is entirely erratic. JAMES LICK appears here in this gallery of immortals because of his will (1875), founding the Lick Observatory. This was undoubtedly a very fine and wise donation, but the will itself hardly deserved to be quoted verbatim.

(2) *Some of the Europeans excluded.* HEVELIUS, JEAN PICARD, CLAIRAUT, D' ALEMBERT, EULER, WARGENTIN, LA CAILLE, TOBIAS MAYER, DELAMBRE, POISSON, HANSEN, FAYE, TISSERAND, POINCARÉ.

I do not claim that all of these men ought to have been included, but I beg the reader to compare these two lists, American and European, and draw his own conclusions.

To show the authors's lopsidedness in another way, it will suffice to

say that almost half of the space is given to America and England, and that more than half of the astronomers quoted (34 out of 56) belong to these two countries. Would anybody claim that more than half of the astronomical work of the last four centuries has been accomplished by the English-speaking people?

Ten astronomers have been allowed ten pages or more : COPERNICUS, KEPLER, GALILEO, NEWTON, BRADLEY, WM. HERSCHEL, LAPLACE, GAUSS, NEWCOMB, PICKERING. To this selection I do not object.

After this statistical survey, which will give the reader an idea of the scope of this anthology, I shall present a few remarks which occurred to me while I was examining it.

A few extracts refer to celestial mechanics, but these are generally offered in such a way that the reader has no means of appreciating either the difficulties of the problems or the beauty of the solutions. Take for example the extract from LAGRANGE's memoir of 1772; it is almost worthless. It would have been better to leave it out altogether than to reduce it to that.

It would have been much wiser to omit GAUSS's demonstration of the method of least squares. To begin with that demonstration is hard to read and yet insufficient. Moreover it belongs to the history of mathematics. It is true the method is used by astronomers, but it is used as well by other experimenters. If one were to include everything applied to astronomical purposes, one might introduce the history of logarithms, of telescopes, of achromatic lenses, of photography, and what not. It is clear that this source book ought to have been restricted to astronomy proper, and the more so because companion volumes will be devoted to mathematics, physics, etc. This very thing ought to have been looked after by the general editor; it is his business to see that each separate editor does not go out of his field, and thus to avoid the possibility of duplications; but what is the use of a general editor who does not edit? To return to the method of least squares, its irrelevancy was more obvious to me because I remembered a witty saying reported by POINCARÉ : « Everybody believes in it because experimenters imagine that it is a mathematical theorem, and mathematicians, that it is an experimental fact. » (1)

A very interesting feature of this selection is the relatively large space allowed to physical and stellar astronomy. It would be wrong to explain this by the fact that the main author is one of the leading stellar astronomers of our time. The true explanation is that stellar astronomy has taken such a tremendous importance that our perspective is now entirely

(1) H. POINCARÉ. Calcul des probabilités (Paris, 1896, 149).

different from what it was twenty years ago. Even as more emphasis is now laid on stellar astronomy in every general course, we must expect any anthology to contain more physics and chemistry than would have been the case at the beginning of this century.

The explanations relative to each extract are much too brief and sometimes utterly insufficient. Take for example the note on ROEMER (p. 70). The date of his discovery that the velocity of light is finite is not given, and the reference to the *Mémoires de l'Académie*, tome X, 1730. will suggest that 1730 is the date, instead of 1676, more than half a century earlier. Same remark with regard to the discovery by GIOVANNI DOMENICO CASSINI of the division in Saturn's ring; it dates not from 1730, but from 1675. But what is worse, and indeed almost unbelievable, the date of KEPLER's fundamental discoveries is not given, nor indicated in any way!

Such essential omissions are the more unfortunate, that this book will not be used by careful scholars, but by general readers, or by astronomers equally careless with regard to historical facts.

While reading this book I realized more deeply that to be entirely satisfactory, such an anthology ought to contain not only extracts but summaries. In some cases, an extract from the original paper is the best way of representing a discovery or a new theory; in other cases, extracts are inadequate, and should be replaced by paraphrases. And in every case, the editor ought to explain the origin of the extract and give a brief description of the whole paper (or work) and of the relation of the extract to it. This applies with special force to extracts from books, such as those of COPERNICUS, GALILEO, or NEWTON. The reader must be able, so-to-say, to visualize these extracts in their natural environments.

Of course, this would require far more labor than the authors of this book were willing to give to it. But if a thing is worth doing at all, it is worth doing well. As a good example of scientific anthology, I would quote EMILE JOUGUET's *Lectures de mécanique* (2 vols., Paris, 1908-09; reprinted in 1924; *Isis*, 7, 156-58), or on a humbler scale HEINRICH WIELEITNER's mathematical selections (*Isis*, 11, 240; 12, 413). When scientific chrestomathies are compiled with such care, they become valuable contributions to the history of the subject. This cannot be said of SHAPLEY's and HOWARTH's work. It is not scholarly, and thus it is not in any sense a contribution to the history of astronomy; yet, insofar as it will stimulate the historical curiosity of astronomers and other men of science, it will undoubtedly be of use, and we greet its ublication with pleasure. GEORGE SARTON.

ejust, Verne, Combes, Parat, Urbain, Dujarric de la Rivière,

de Saint-Rat. — *Études sur la chimie physiologique de la peau*, 381 p. AMÉDÉE LEGRAND, Paris, 1928

Ce livre, qui est le résultat d'une série de conférences faites à l'Hôpital Saint-Louis, le grand centre parisien des maladies cutanées, témoigne de l'intérêt croissant du monde médical pour la chimie biologique. Les auteurs sont tous des hommes de laboratoire, qui apportent à la question de la chimie de la peau non seulement une vaste érudition, mais aussi leurs expériences personnelles sur des problèmes connexes. Les sujets sont traités d'un point de vue très général, en s'appuyant sur les données de la biologie expérimentale beaucoup plus que sur des résultats cliniques.

L. H. DEJUST expose la question des pigments mélaniques, la mélanogénèse, et les ferments cutanés, et montre qu'il existe, non pas une mélanine, mais des séries de mélanines. Cet auteur incline à croire que la mélanogénèse humaine est un phénomène diastasique, et montre que les quantités de ferment contenues dans la peau varient vraisemblablement sous des influences physiologiques ou pathologiques. J. VERNE traite des pigments cutanés dans la série animale, de leur localisation, et de l'histochimie de leur métabolisme. Une de ses conclusions est que les substances pigmentaires apparaissent comme des corps engagés dans une véritable impasse bio-chimique, par suite d'une désintégration incomplète aboutissant à des composés que l'organisme est incapable de modifier plus avant.

RAOUL COMBES compare la pigmentation végétale à la pigmentation animale, mettant en parallèle la pigmentogénèse anthocyanique des végétaux et la mélanogénèse chez les animaux. MAURICE PARAT montre tout l'intérêt des récentes études sur le p_H interne de la cellule animale et leur application au tissu cutané. Suivent deux chapitres qui ont trait à la pathologie de la peau. Le premier est de ACHILLE URBAIN, sur le rôle de la peau dans l'infection et l'immunité. URBAIN met en lumière l'importance de l'immunité locale de la peau, découverte par BESREDKA. Le second chapitre est de R. DUJARRIC DE LA RIVIÈRE sur le mécanisme des cuti-réactions — tuberculinique, diphtérique, etc. L'auteur insiste sur la valeur des méthodes physico-chimiques dans ce domaine. La dernière étude, enfin, par L. DE SAINT-RAT, envisage l'application des microméthodes à la chimie biologique de la peau. Ici sont traités les constituants chimiques, les éléments minéraux, les principes immédiats organiques, et les diastases.

Ces exposés, conçus dans un sens très large, seront d'une très grande utilité, non seulement pour les dermatologistes et autres médecins, mais encore pour tous les biologistes.

Paris. R. M. MAY.

James Harvey Robinson. — ***Civilization.*** 62 p. London and New York, Encyclopaedia Britannica, April, 1929.

A copy in book form of this fine introductory essay has been presented to the founder subscribers of the 14th Edition of the Encyclopaedia Britannica. This 14th edition will appear within a year; it will include 24 vols., i.e., some 35,000,000 words. The 24 vols. will be published and distributed simultaneously. That is, they will truly represent the state of human knowledge on almost every conceivable subject in the year 1929. As I have pointed out before (*Isis*, 1, 290) one of the great superiorities of the Britannica over other encyclopaedic undertakings is this very simultaneity.

The author of the introductory essay has asked himself « What does such a monumental publication mean? » It is perhaps the most significant symbol of our « civilization », not only because of its contents, a treasure of knowledge of almost incredible wealth and accuracy, but also because of the tremendous organization which its existence implies. And what is civilization? ROBINSON's answer need not be set forth in this place, for our readers know it well enough. It is the answer of a humanist who has learned to look at things and at himself at once from a scientific and from a historical point of view. It is indeed the answer of a New Humanist.

In order to illustrate the very lateness and newness of our present culture, or we might say, of conscious civilization, the author uses a very happy comparison: « Let us imagine that 500,000 years of developing culture were compressed into 50 years. On this scale mankind would have required 49 years to learn enough to desert here and there his inveterate hunting habits and settle down in villages. Half through the fiftieth year writing was discovered and practised within a very limited area, thus supplying one of the chief means for perpetuating and spreading culture. The achievements of the Greeks would be but three months back, the prevailing of Christianity, two; the printing press would be a fortnight old and man would have been using steam for hardly a week. The peculiar conditions under which we live did not come about until Dec. 31 of the fiftieth year. »

To return to the Encyclopaedia Britannica, the first edition of it appeared in 1768 (3 vols.); two more editions were published during the eighteenth century (10 and 18 vols.), four in the first half of the nineteenth century and two more in the second half. The tenth edition, which appeared at the beginning of this century (1902-03), was simply the ninth edition (25 vols.) plus eleven supplementary volumes. The eleventh edition was published in 1910-1911 (29 vols.). It was followed in 1913 by the Britannica Year Book (see *Isis*, 1, 290-92), a new undertaking which apparently failed (perhaps, because of the War) and was not continued.

The twelfth and thirteenth editions (1922 and 1926) consisted of three supplementary volumes each. As opposed to these, the fourteenth edition, now printing, will be entirely new, being the first complete revision in eighteen years. It will differ materially from previous editions in being more practical, i.e., paying relatively more attention to the useful every-day information, containing more articles and avoiding those of inordinate length, and by very abundant illustrations.

I told the history of the Britannica to make the historians of science realize the value of the older editions. Few people think of consulting the old editions, and yet these afford one of the best and simplest means of ascertaining the gradual progress of knowledge in almost any subject from 1768 on. GEORGE SARTON.

Fielding H. Garrison. — ***An introduction to the history of medicine.*** With medical chronology, suggestions for study and bibliographic data. Fourth edition, revised and enlarged. 996 p., 286 portraits and other illustrations, Philadelphia, W. B. SAUNDERS, 1929 (twelve dollars.)

Col. GARRISON's History is already so well known in the English-speaking world, and even outside of it, that it is hardly necessary to describe or to praise it. It will suffice to say in what the new edition differs from the previous ones. The first appeared in 1914 (763 p.), the second in 1917 (905 p.); the third in 1921 (942 p.). This third edition was fully reviewed in *Isis*, 4, 554-56. Note the constant increase, which is even greater than the numbers of pages suggest, for smaller type has been used in larger proportion. Says the author (p. 5) « In addition to the new material in the terminal chapters, a section on medicine in prehistoric times has been added; effort has been made to do justice to the recent medicine of Russia, Italy, Spain, and the Latin-American countries, and the chronology and bibliographies in the appendices have been increased nearly twofold. » I noted with special pleasure (1) the accounts of social medicine, (2) the abundant chronology, covering no less than 70 p. in small type and extending to 1928 : (3) the rich bibliography at the end (p. 884-922, 39 p. in very small type) and the footnotes; (4) the stimulating and amusing questions and exercises; (5) and the splendid gallery of portraits.

Let us now consider the proportions of this new edition, and compare them with those of the previous one. For each division I indicate the number of pages (1) of the 4th edition; (2) of the third. Primitive and oriental medicine, 62 against 54; Greek and Greco-Roman, 42 against 39; Mediaeval, 72 against 75; Renaissance to 1600, 52 against 56; seventeenth century, 65 against 73; eighteenth century, 97 against 110; nineteenth century and after, 401 against 394. The comparison is interesting,

but I shall let the reader draw his own conclusions. The outstanding fact is that this history is primarily a history of modern medicine, and its excellence is largely restricted to an exceptionally abundant account of the nineteenth century achievements. This is a statement of fact, not a criticism. It is probably this kind of history which will serve the needs of medical students best.

However, the reviewer cannot but deplore that all of the ancient part remains comparatively neglected. It is not so much a matter of details; it is the general structure which is wrong for the whole period anterior to the sixteenth century or even to the seventeenth. The whole frame of the first half of the book is hopelessly antiquated. It is a pity that the author or the publisher or both lacked the courage of breaking it to pieces, and rebuilding it entirely. Think of Egyptian medicine disposed of in seven pages! And of the very title « Sumerian and Oriental medicine », which made me think of a little hotel in Paris, that calls itself, « Hôtel de l'Univers et du Portugal »! (18 p. for the lot, Sumerians and Orientals). Another queer title is the Mohammedan and Jewish periods, 732-1096 (16 p.). This account is childish; and why call the upper limit 1096?; the author does not fail to say a few words of IBN ZUHR, IBN RUSHD, and MAIMONIDES, who belong to the twelfth century. The following chapter, The Medieval period, is limited by the dates 1096-1438, but what 1438 stands for, I don't know.

But it would be ungracious to insist. It is better to be thankful for the very abundant harvest of facts and ideas which the author has so diligently collected for many years in spite of exacting professional duties, and to hope that the success of this edition will warrant the preparation of many others. GEORGE SARTON.

George Lyman Kittredge. — *Witchcraft in Old and New England*, 641 p., Harvard University Press, Cambridge, Massachusetts, 1929. (six dollars).

Of late years we have had, if anything, rather too many works appearing in English on the theme of witchcraft, although we are still waiting for the edition of H. C. LEA's materials on that subject, announced some time ago. WALLACE NOTESTEIN's prize essay for the American Historical Association on witchcraft in England from 1558-1718 (published in 1916) was well enough, but Miss M. A. MURRAY's *The Witch-Cult in Western Europe*, 1921, with its dubious hypothesis, introduced a sensational element which was carried much farther in the credulous farrago put forth by MONTAGUE SUMMERS under the title, *The History of Witchcraft and Demonology*, 1926, after perusing which I have not cared to look at the same author's subsequent *Geography of Witchcraft*, 1927, or *The Discovery of Witches*, 1928. In 1926 also appeared J. W.

WICKWAR's *Witchcraft and the Black Art*, of which the calibre may be gauged from the statement in its preface that « up to the present, very little of a popular nature has been written on the subject ».

Between the magic of the learned and witchcraft there is much the same great gulf fixed as there is between science and folklore, or GOETHE's *Faust* and The Police Gazette. We often hear of books of magic, but witches had no libraries. Magic has some intellectual content and interest, some ingenuity, some inventiveness, some philosophy, some relation to experimental and applied science, to astrology and alchemy, to mysticism and pharmacy. On the other hand, witchcraft is the lowest form of magic, a dirty and degrading superstition, the work not of intellectuals but of the vulgar, the product not of semi-scientific curiosity but of foul imagination. One fears that much of the present reading about it is motivated by all too similar attitudes to those which favored the witchcraft delusion and persecutions of the past, and that the subject now as then is receiving an attention disproportionate to its importance.

But now comes Professor KITTREDGE with his thoroughly scholarly contribution, conceived and executed with hard New England common sense, which should, and we trust will, serve to dispel some of the noxious vapors and miasmas which have emanated from the subject. We must confess that we cannot read about it with quite the unfailing zest with which he writes detail after detail and piles up reference upon reference. But if we have to read about it, we are glad to have him to read, especially his outspoken conclusions whose vigor we may admire even if we do not entirely agree with them.

In distinction from JOSEPH HANSEN (*Zauberwahn, Inquisition und Hexenprozess im Mittelalter*, 1900) who tried to saddle the blame for the witchcraft delusion and persecution of early *modern* times, coterminous with the age of so-called Renaissance and Reformation, upon *medieval* theology and Inquisition, KITTREDGE seems to recognize that it was largely a matter of public opinion, mob psychology, and popular panic, a social and sociological rather than a religious and theological phenomenon. He further maintains that « belief in witchcraft is the common heritage of humanity », that « it is not chargeable to any particular time, or race, or form of religion, » and that « witchcraft in some shape or other is still credited by a majority of the human race. » (p. 372). KITTREDGE is justified, I think, in not accepting HANSEN's highly specialized conception of the witch, but I feel that he makes his own definition too broad and that his book treats of various kinds of magic which have no necessary connection with witchcraft. He is also rather too prone to assume that magic necessarily implies dealings with spirits, whereas it may be a purely human attempt to control nature directly. Nor

am I quite convinced that « the position of the seventeenth-century believers in witchcraft was logically stronger and theologically stronger than that of the few persons who rejected the current belief ». At least their premises were poorly chosen.

Professor KITTREDGE abundantly demonstrates that that much maligned monarch, JAMES THE FIRST, because of his book on demonology has been unjustly censured as a prime mover in the spread of the witchcraft persecution in England. « The plain and simple truth is this : During the twenty-two years of JAMES's reign (1603-1625), there was no more excitement on the subject of witchcraft, and there were no more executions, than during the last twenty-two years of ELIZABETH (1580-1603) » (p. 288). JAMES frequently exposed impostors personally with much insight and ingenuity, and, by showing that on one occasion innocent persons had been executed, led the judges to be more circumspect in subsequent trials. KITTREDGE would also exculpate the Puritans of New England from any particular blame. « The record of New England in the matter of witchcraft is highly creditable, when considered as a whole and from the comparative point of view » (page 373). He further denies that belief in witchcraft was introduced by returning Protestant refugees from the continent. Moreover, « in no single recorded witch-trial during the reign of ELIZABETH is there the slightest trace of the Witches' Sabbath ». (p. 247).

KITTREDGE advances the theory that witchcraft persecution manifests itself in sudden outbreaks at irregular intervals and that these may be accounted for by perturbed conditions of the public mind caused by political or religious crises. Why he here omits economic crises is not clear. It also seems strange that he has not been impressed by the possible correlation between the witchcraft outbreaks and the prevalence of the plague and other epidemics in the early modern centuries; or with the chronic state of popular misery induced by the break-down of medieval charity organization and town prosperity, and by the wars of religion and territorial aggrandizement.

KITTREDGE entitles his book *Witchcraft in Old and New England* to indicate that he is not concerned with the witchcraft delusion on the continent of Europe. But to support his contention that the belief in witchcraft is the common heritage of humanity he often takes us on excursions to Africa, India, or the South Sea Islands, following that method of comparative folklore which makes light of all bournes of time and space. In such flights the folklorist's pen is more powerful than even the witch's broomstick. The publisher's « blurb » on the jacket for once hits the bullseye with unerring accuracy when it remarks, « Here he has gathered all sorts of stray notes... » Successive chapters deal with such themes as « Image Magic and the Like, Love and Hate,

Madness, Curses and the Elfshot, Venefica, Charms Ghoulish and Profane, Wind and Weather, The Witch in the Dairy, Metamorphosis, Mirrors and Thieves, Treasure Trove, Haunted Houses and Haunted Men, The Seer, Cold Water. » There is interesting, though succinct, treatment of English medieval state trials involving charges of sorcery in the second chapter on « English Witchcraft before 1558 ». The notes are massed at the close or rather in the second half of the volume, since they occupy pages 375-598, and, if we allow for the finer and closer type in which they are printed, are quite as long as the text. There is a good index covering all the multifarious references to the literature of the subject as well as the text proper. If those interested in witchcraft would read all these citations, we predict that they would be both sadder and wiser men.

And now, Aroint thee, witch ! LYNN THORNDIKE.

Twenty-Sixth Critical Bibliography

of the

History and Philosophy of Science and of the History of Civilization

(*to March* 1, 1929)

This Twenty-sixth Bibliography contains about 718 items, some of which have been kindly contributed by the following scholars:

H. G. Bevenot (Weingarten Abbey, Würtemb.)
T. L. Davis (Cambridge, Mass.).
C. H. Desch (Sheffield).
L. Guinet (Brussels)
J. W. S. Johnsson (Copenhagen).
E. Kremers (Madison, Wisc.).
C. D. Leake (San Francisco).
Alexander Marx (New York).
Lynn Thorndike (New York).
J. K. Wright (New York).

This bibliography includes a complete analysis of volume 11, and the eighth series of addenda and errata to Volume I of my *Introduction to the History of Science* (Baltimore and London, 1927). An authors' index will be found at the end.

Papers and books sent to the Editor are entered into this bibliography if they are relevant to its purpose. They may be the object of analytical notes or longer reviews, if this seems sufficiently necessary and the services of competent scholars are available. It is obvious that only a small number of publications can be adequately reviewed and that it is not even possible to give a brief description of each and every one. However, our classification is so comprehensive and so minute, that even if we do nothing but give the accurate title of an item and put it in its proper place, we are already rendering a real service to the author, the publisher and the learned public. It should also be noted that there is no relation between the importance of a publication and the length of the note devoted to it.

The authors sending publications written in a language which the majority of western critics cannot be expected to read, will save the Editor much trouble and themselves unpleasant delays by adding a summary in one of the six international languages (English, French, German, Italian, Latin, Spanish).

The ultimate aims of this undertaking are : (1) to establish the History of Science as an independent discipline; (2) to demonstrate inductively the Unity of Knowledge and the Unity of Mankind; (3) to serve as a center of information and rallying ground to the scholars engaged in our studies.

Harvard Library, Room 185. GEORGE SARTON.
Cambridge, Massachusetts. *April* 4, 1929.

PART I.

FUNDAMENTAL CLASSIFICATION (CENTURIAL).

IXth Century B. C.

Herrmann, Albert. Die Irrfahrten des Odysseus. *Meereskunde*, 15, 3, 32 p., 1926. ISIS

As the Odyssey forms a mosaic of fragments of different dates (see *Isis*, 9, 492), no single route can be drawn on the modern map as representing the poets'conception of the wanderings of Odysseus (see *Geographical Review*, 16, 669-671, 1926). J. K. W.

Körner, Otto. Die ärztlichen Kenntnisse in Ilias und Odyssee. VIII + 90 p. München, BERGMANN, 1929. ISIS

Schwartz, Eduard. Die Odyssee. VI + 342 p. München, HUEBER, 1924. ISIS

Wilamowitz-Moellendorff, Ulrich v. Die Heimkehr des Odysseus. Neue homerische Untersuchungen. VI + 205 p. Berlin, Weidmannsche Buchhandlung, 1927. ISIS

VIth Century B. C.

Davids, (Mrs.) C. A. F. Rhys. Gotama the man. 302 p. London, LUZAC, 1928. ISIS

Vth Century B. C.

Democritos. Doctrines philosophiques et réflexions morales, traduites et précédées d'une introduction par MAURICE SOLOVINE. XLVII + 171 p. Paris, ALCAN, 1928. ISIS

Reviewed by P. J. RICHARD, *Revue générale des sciences*, 39, 718, 1928.

Hennig, R. HANNOS « Götterwagen ». *Geographische Zeitschrift*, 33, 378-392, 1927. ISIS

The θεῶν ὄχημα (chariot of the gods), or, more probably, θεῶν οἴχημα (abode of the gods), of HANNO is here identified with the volcano of Cameroons. J. K. W.

Koch, Richard. Auslegung des zweiten hippokratischen Aphorismus. Beitrag zur Technik des Unterrichtes in der Geschichte der Medizin. Festschrift MAX NEUBURGER gewidmet, 209-18, 1928. ISIS

Palmer, H. R. The Lixitae of HANNO. *Journal of the African Society*, 27, 7-15, 1927. ISIS

Phillipson, Coleman. The trial of SOCRATES. London, STEVENS, 1928. ISIS

Temkin, Owsei. Der systematische Zusammenhang im Corpus Hippocraticum. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 11-43, 1928. ISIS

Witte, Johannes. Mê Ti, der Philosoph der allgemeinen Menschenliebe und sozialen Gleichheit im alten China. Ein Quellenbuch. 56 p. Leipzig, HINRICHS, 1928. ISIS

Reviewed by ALFRED FORKE, *Deutsche Literaturzeitung*, 6, 9-11, 1929.

IIIrd Century B. C. (whole and first half).

Dubs, Homer H. HSÜNTZE, the moulder of ancient Confucianism. (*Oriental Ser.*, vol. 15). XXXI + 308 p. London, PROBSTHAIN, 1927. ISIS

Reviewed by A. FORKE, *Deutsche Literaturzeitung*, 5, 2052-54, 1928.

IIIrd Century B. C. (second half).

Cajori, Florian. The sieve of ERATOSTHENES. *Science*, 68, 620, 1928. ISIS

Refutation of MILLER's views on the subject (*Science*, 68, 273).

Ist Century B. C. (second half).

Billiard, Raymond. L'agriculture dans l'antiquité, d'après les Géorgiques de VIRGILE. 539 p., 84 fig., 6 pl. Paris, BOCCARD, 1928. ISIS

Reviewed by VICTOR CHAPOT, *Journal des Savants*, 265-274, 1928.

Conway, Robert Seymour. Harvard lectures on the Vergilian age.

XI + 162 p., 16 pl. Cambridge, Mass., Harvard University Press, 1928. ISIS

Ist Century (whole and first half).

Riddle, Donald W. JESUS and the Pharisees. A study in Christian tradition. IX + 193 p. University of Chicago Press, 1928. ISIS

Toll, Hugo. Dog JESUS på Korset? 190 p. Stockholm, WAHLSTROM and WIDSTRAND, 1928. ISIS

The author argues on physiological grounds that JESUS did not die on the cross; he only swooned and then the resurrection is no wonder. The same question once (1640) interested THOMAS BARTHOLIN (*De latere Christi aperto* and *De Cruce Christi*), who nearly developed the same argument. The book is a very learned one in which the modern Bible critic plays a great role at the same time as the physiological facts are used in a very convincing way. J. W. S. J.

IInd Century (first half).

Arrianus, Flavius. FLAVII ARRIANI quae exstant omnia. Edidit A. G. ROOS. Vol. II: Scripta minora et fragmenta. (*Bibliotheca scriptorum Graecorum et Romanorum Teubneriana.*) LI + 324 p. Leipzig, TEUBNER, 1928. ISIS

Reviewed by JOH. SYKUTRIS, *Deutsche Literaturzeitung*, 6, 214-16, 1929.

IInd Century (second half).

Lulofs, H. J. GALENUS over gewoonten. *Bijdragen tot de geschiedenis der geneeskunde*, 8, 305-14, 1928. ISIS

McCrindle, J. W. MCCRINDLE's ancient India as described by PTOLEMY. A facsimile reprint edited with an introduction, notes and an additional map by SURENDRANATH MAJUMDAR SÂSTRÎ. XXXIX + 431 p., 2 maps. Calcutta, CHUCKERVERTTY, CHATTERJEE, 1927. ISIS

« Facsimile reprint of the original edition published in Bombay in 1885 together with an introduction and notes (by the editor) embodying the latest researches supplementing the commentary of Dr. MCCRINDLE ».

Meyer-Steineg, Theodor. Zur Gynäkologie der METRODORA. Festschrift MAX NEUBURGER gewidmet, 261-64, Wien, 1928. ISIS

« Wenn wir nun das Werk als ganzes nehmen, so müssen wir ihm, wie bereits oben gesagt wurde, eine gewisse Sonderstellung in der antiken gynäkologischen Literatur anweisen. Abgesehen davon, dass die wirklich medizinische Literatur keinerlei Notiz von der Schrift der METRODORA nimmt, dass ferner alle in ihr wiedergegebenen anatomisch-physiologischen und pathologischen Tatsachen aus dritter Hand geschöpft zu sein scheinen, während

umgekehrt mancherlei Kenntnisse und Betrachtungsweisen, die einer Frau eher als einem Manne liegen, entschieden unmittelbarer wirken — alle diese Tatsachen weisen darauf hin, dass es sich um ein Produkt der volksmedizinischen Literatur handelt und dass vielleicht eine als Hebamme in der Praxis erfahrene, durch Lektüre mit der vorhandenen gynäkologischen Literatur bekanntgewordene Frau als Verfasserin anzusprechen ist. »

Meyerhof, Max. Über echte Schriften GALENS, welche die Araber noch besassen. Festschrift MAX NEUBURGER gewidmet, 257-60, Wien, 1928. ISIS

Meyerhof, Max. Über das Leidener arabische Fragment von GALENS Schrift über die medizinischen Namen. Sonderabdruck aus den *Sitzungsberichten der Preussischen Akademie der Wissenschaften, Phil.-Hist. Klasse*, 23, 26 p., 1928. ISIS

« Unter den vielen heute verlorenen Schriften GALENS, welche die Araber jener Zeit noch besessen haben, wird auch (unter Nr. 114) das Buch 'Über die ärtzlichen Namen' angeführt. DIELS nennt es in seinem Katalog *De nominibus medicinalibus* und erwähnt, dass es nur arabisch in Leiden (Bibl. Acad. 1300) erhalten sei. Bei Gelegenheit des VI. Internationalen Kongresses für Geschichte der Medizin konnte ich in der Leidener Bibliothek selbst die betreffende Handschrift einsehen, und photographieren lassen. Indem ich mir die Herausgabe im Rahmen des *Corpus Medicorum Graecorum* für später vorbehalte, möchte ich zunächst nur nach meiner erstmaligen Übersetzung eine Inhaltsangabe mit Einschaltung übersetzter Teilstücke geben. »... « Über den Inhalt der vier verlorenen Bücher wissen wir, wie oben bemerkt, nur wenig. Während das erste die Einleitung und eine Abhandlung über den Namen Fieber (πυρετός) enthält, war eines der anderen ganz dem Ausdruck Element (στοιχεῖον) gewidmet, und im 5. Buche war von dem Wort Natur (φύσις) die Rede. Im ganzen muss man sagen, dass das erhaltene Fünftel der Schrift nicht allzuviel Neues bringt und uns vorwiegend einen Beitrag zur Psychologie GALENS liefert. »

Meyerhof, Max. Über echte und unechte Schriften GALENS nach arabischen Quellen. Sonderabdruck aus den *Sitzungsberichten der Preussischen Akademie der Wissenschaften, Phil.-Hist. Klasse*, 28, 18 p., 1928. ISIS

« Somit haben die Araber um 900 n. Chr. noch eine Anzahl für uns verlorener Schriften GALENS besessen, die wohl ziemlich verbreitet und leicht erreichbar sein mussten, da QUSTĀ B. LŪQĀ sie als zum regelrechten Lehrgange der Heilkunde gehörig anführt. In dem vorstehend gegebenen Fragment finden sich in den zehn Lehrfächern, die es umfasst, sieben für uns verlorene galenische Schriften.

« Mit der obigen Darstellung ist für den Augenblick mein Material zur Bibliographie des GALEN bei den Arabern erschöpft. Doch verspricht das Studium der frühen arabischen Schriften zur Heilkunde, insbesondere des gewaltigen *Ḥâwî* des RĀZĪ, noch manche Ergebnisse. Vor allem aber liegen offenbar noch riesige Schätze an aus dem Griechischen ins Arabische übersetzten Schriften, vorwiegend des GALEN, in den mangelhaft oder gar

nicht katalogisierten Bibliotheken von Konstantinopel und Umgebung. HELMUT RITTER, der dort eifrig arbeitet, hat mich schon überraschend reichhaltige Proben aus den dortigen Handschriftenschätzen sehen lassen, und ich hoffe, dass es ihm in absehbarer Zeit möglich sein wird, umfangreiche Ergänzungen zum Katalog von DIELS zu liefern. »

Meyerhof, Max. Autobiographische Bruchstücke GALENS aus arabischen Quellen. *Archiv f. Gesch. d. Med.*, 22, 72-86, 1929. ISIS

Wenkebach, Ernst. Beiträge zur Textgeschichte der Epidemienkommentare GALENS. Part 1, 96 p. Berlin, *Akademie der Wissenschaften*, 1928. ISIS

Wenkebach, Ernst. Dichterzitate in GALENS Erklärung einer hippokratischen Fieberbezeichnung. Eine textkrit. Unters. (*Abh. der Sächs. Ak. der Wiss., phil.-hist. Kl.*, 39. Nr. 1). 52 p. Leipzig, HIRZEL, 1928. ISIS

Reviewed by JOHANNES MEWALDT, *Deutsche Literaturzeitung*, 5, 2307-8, 1928.

IVth Century (whole and first half).

(Palladius). PALLADII RUTILII TAURI AEMILIANI viri illustris : Opus agriculturae, liber quartus et decimus De veterinaria medicina edidit JOSEF SVENNUNG. Gotoburgi, ERANOS Förlag, 1926. ISIS

Reviewed by SIGFRID GREVANDER : Ein neugefundenes Buch des PALLADIUS, in *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 3-13, 1928. « Ueber die Echtheitsfrage des neugefundenen Buches wird man sich vielleicht noch in der wissenschaftlichen Welt streiten. Die Textgestaltung kann sich auch in Einzelfällen diskutieren lassen. Die wissenschaftliche Leistung des Herausgebers kann dagegen nicht in Frage gesetzt werden. Er hat eine bis jetzt so gut wie unbekannte Handschrift der Wissenschaft erschlossen. Die Ausgabe liegt in der Gestalt vor, dass sie den Text und seine Quellen dem Forscher leicht zugänglich macht. Die grammatischen Konstruktionen sind in sehr verdienstvoller Weise in die Indices eingearbeitet worden. Inhaltlich bietet das Buch zwar nicht viel Neues, aber doch mehr als man beim ersten Blick entdeckt. »

IVth Century (second half).

Bludau, August. Die Pilgerreise der Aetheria. 294 p. Paderborn, SCHÖNINGH, 1927. ISIS

Reviewed by PAUL MONCEAUX, *Journal des Savants*, 414, 1928.

Vth Century (whole and first half).

(Augustin, Saint). Soliloques. Traduction de P. DE LABRIOLLE;

introduction de B. GROETHUYSEN. 179 p. Paris, SCHIFFRIN, 1927. ISIS

Reviewed by PAUL MONCEAUX, *Journal des Savants*, 413, 1928.

Vth Century (second half).

Aryabhata. The Aryabhatiyam (translation) by PRABODH CHANDRA SENGUPTA. Reprinted from the *Journal of the Department of Letters*, vol. 16, 56 p. Calcutta University Press, 1927. ISIS

This English translation is accompanied and elucidated by a running commentary. As I am not a Sanskritist I cannot appreciate its accuracy, but the work seems to have been done with considerable care. G. S.

Sengupta, Prabodh Chandra. ARYABHATA, the father of Indian epicyclic astronomy. Reprinted from the *Journal of the Department of Letters*, 18, 56 p. Calcutta University Press, 1928. ISIS

This elaborate paper is divided as follows: 1. Introduction; 2. ARYABHATA as an observer; 3. ARYABHATA as a systematizer; 4. The Siddhantas before the time of ARYABHATA; 5. The Vasistha Siddhanta of VARAHAMIHIRA; 6. Babylonian astronomy; 7. The Paulisha Siddhanta of the Pancha Siddhantika; 8. The Romaka Siddhanta of the Pancha Siddhantika; 9. The Surya Siddhanta and the epicyclic theory; 10. ARYABHATA's astronomical systems; 11. ARYABHATA's unquestioned originality; 12. Separation of the inequalities of apsis and of conjunction of a planet by the method of the ancients.

A part of the author's conclusion may be quoted: «If Indian astronomy is to be held indebted to any foreign system of astronomy that system of astronomy was the Babylonian astronomy — the fountain-head from which both the (Greek and Indian) systems took their rise. The form in which that system of astronomy was known was the Surya Siddhanta with its gods of Manda and Sighra, as producers of planetary inequalities. These inequalities were no doubt separated by the Babylonians first, who were not only content with finding the multiples of the synodic and sidereal periods of revolution, but also calculated and foretold the conjunctions and oppositions of planets. These were the natural steps which automatically separated these twofold planetary inequalities. There is no difficulty in seeing that the Indian astronomer learnt the method of separating these inequalities from the writings of the Babylonians. We have seen before that the Vasistha Siddhanta as summarised in the Pancha Siddhantika, also speaks of the synodic periods of planets and also of their courses; these rules of prediction, coupled with observation, must have furnished the Indian astronomers with these methods. It appears from evidence quoted before that the astronomer PRADYUMNA made a special study of the superior planets, and that the astronomer VIJAYANANDIN made a special study of the inferior planets. Both these astronomers flourished before the time of ARYABHATA. The astronomical treatises of these two writers and other astronomical records furnished new materials at the hands of ARYABHATA, who set about and determined the astronomical constants anew. What was done by HIPPARCHUS among the Greeks, was done in India by astronomers of the type VIJAYANANDIN and PRADYUMNA. Their work lay in the verification and correction of the

Babylonian astronomy. The Indian epicyclic astronomy, as far as it can be called so, was then constructed by ARYABHATA, from whom alone all the later Indian astronomers drew their inspiration. Thus the position of ARYABHATA in India was the same as that of PTOLEMY in Alexandria. This explains the reason why ARYABHATA is held in so great esteem by all Indian writers. »... « One word more is perhaps necessary to explain the existence of a few Greek terms in Indian astronomy. These terms (though not used by ARYABHATA excepting only in one occasion) in the most convenient forms were probably absent in Indian and Babylonian systems of astronomy, and they were indeed taken from the Greek source. As regards the pseudo-science of astrology, the Babylonians and the Greeks were regarded as masters. Consequently there is no want of Greek terms in Indian astrology. » The author is lecturer in Indian astronomy, Calcutta University, and professor of mathematics, Bethune College, Calcutta. His hypothesis that both the Greek and Indian systems have probably a common Babylonian origin is very plausible, but not yet proved. With regard to the Greek side of the question I would like to draw the reader's attention to PAUL SCHNABEL's memoir of 1926 (*Isis*, 10, 107) ascribing the discovery of the precession of the equinoxes to the Babylonian astronomer KIDINNU (c. 343 B. C.). And this raises the query: what did the early Indian astronomers know of the precession? G. S.

VIth Century (whole and first half).

Anthimus. De observatione ciborum ad THEODORICUM regem Francorum epistula. Recensuit EDUARDUS LIECHTENHAN. (*Corp. Med. Lat.* VIII, 1). XIX + 57 p. Berlin, TEUBNER, 1928. ISIS

Cooper, Lane. A concordance of BOETHIUS. The five theological tractates and the Consolation of Philosophy. Cambridge, Mediaeval Academy of America, 1928. ISIS

« The Concordance of BOETHIUS aims to include every word and virtually every variant reading in the Consolation of philosophy and in the five theological tractates now assigned to BOETHIUS, together with illustrative quotations for all but the less important particles and the like. It thus furnishes a complete and convenient index to these important works. »

Drecker, J. Des JOHANNES PHILOPONOS Schrift über das Astrolab. *Isis*, 11, 15-44, 3 fig., 1928. ISIS

German translation of the text edited by H. HASE in *Rheinisches Museum*, vol. 6, 1839. G. S.

Woodward, B. B.; Singer, Charles. Manuscript herbals. *Nature*, 122, 844, 1928. ISIS

Apropos of early copies of the famous *Codex Aniciae Julianae*, for which see my *Introduction* (vol. 1, 431). G. S.

VIIIth Century (second half).

Anan ben David. (*Introduction*, vol. 1, 525). The best article on Qaraites is by POZNANSKI in HASTINGS's Dictionary of religion and ethics (vol. 7, 662-72). On ANAN, see HARKAVY in *Jahrbuch für jüdische Geschichte und Literatur* (vol. 2, 107-22, Berlin, 1899) and POZNANSKI : ANAN et ses écrits (*Revue des études juives*, 44, 161-87; 45, 50-69, 176-203). Fragments of ANAN's code were published by HARKAVY in 1903 and by SCHECHTER in 1910. A. M. ISIS

Jâbir ibn Ḥaiyân. The works of GEBER. Englished by RICHARD RUSSELL, 1678. A new edition, with introduction by E. J. HOLMYARD. XL + 264 p. London, DENT, 1928. New York, DUTTON. ($ 2). ISIS

There has been so much discussion of late on JÂBIR that this handsome reprint is very timely. The treatises included are : The investigation or search of perfection; The sum of perfection or the perfect magistery; The invention of verity or perfection; Furnaces, etc. with a recapitulation of the author's experiments. Illustrations have been borrowed from the Latin edition, *Alchemiae Gebri Arabis...* (Bern, 1545). These treatises are unknown in Arabic and their authenticity is far from certain. Says HOLMYARD « It is possible that they are genuine translations from Arabic books of JÂBIR; or that they are genuine translations from Arabic books of other chemists; or that they are summaries, made in mediaeval Europe, of JÂBIR's Arabic books; or that they are mediaeval European forgeries made by an unknown author and merely fathered upon JÂBIR in order to ensure a favourable reception. Whatever the future may disclose concerning them, we may safely say that they are not unworthy of JÂBIR and that he is worthy of them; and that we know of no other chemist, Muslim or Christian, who could for one moment be imagined to have written them. » G. S.

(Jâbir ibn Ḥayyân). The Arabic works of JÂBIR IBN ḤAYYÂN. Edited with translations into English and critical notes by ERIC JOHN HOLMYARD. Volume 1, part 1 (Arabic texts). 16 + 172 p. Paris, GEUTHNER, 1928. ISIS

HOLMYARD is planning to publish a critical edition of JÂBIR's works, together with English translation and notes. This will be an important step towards a better knowledge of Arabic alchemy. The first part contains the Arabic text of eleven treatises, reprinted from the lithographed edition published at Bombay, 1891, by the bookseller, MÎRZÂ MUḤAMMAD AL-SHÎRÂZÎ. The treatises included are : 1. Kitâb al-bayân; 2. Kitâb al-ḥajar; 3. Kitâb al-nûr; 4. Risâlat al-'iḍâḥ; 5. Kitâb usṭuquss al-'uss al-auwal; 6. Kitâb usṭuquss al-'uss al-thânî; 7. Kitâb usṭuquss al-'uss al-thâlith; 8. Tafsîr kitâb usṭuquss; 9. Kitâb al-tajrîd; 10. Kitâb al-raḥmat al-ṣaghîr, 11. Kitâb al-mulk. G. S.

Mâshâllâh (*Introduction*, vol. 1, 531). It is very doubtful whether his Hebrew name was really MANASSEH; STEINSCHNEIDER denied it. A. M. ISIS

Saeki, P. Yoshio. The Nestorian monument in China. With an introductory note by Lord WILLIAM GASCOYNE CECIL and a preface by A. H. SAYCE. 342 p. London, S. M. K., 1928. ISIS

Ya'qûb ibn Ṭâriq (*Introduction*, vol. 1, 530). See STEINSCHNEIDER in *Z. d. deutsch. morgenl. Ges.* (24, 332 seq.). A. M. ISIS

IXth Century (whole and first half).

Abû Ma'shar (*Introduction*, vol. 1, 568). For ABU MA'SHAR see F. BOLL, Eine Arabisch-Byzantinische Quelle des Dialogs Hermippos, Heidelberg, 1912, where the eighth chapter of his *De revolutionibus nativitatum* is published in Arabic, Latin, and in a Byzantine Greek translation. A. M. ISIS

Jehuda ben Quraish (*Introduction*, vol. 1, 581). For QURAISH see BACHER, Anfänge der hebräischen Grammatik, p. 63-70 (reprint from *ZDMG*, 49); EPPENSTEIN, Die hebräisch-arabische Sprachvergleichung des JEHUDA IBN QURAISH, *MGWJ*, 44, 486-507. A. M. ISIS

al-Kindî (*Introduction*, vol. 1, 560). H. MALTER: AL-KINDÎ (Hebrew Union College Annual, Cincinnati, 1904, 55-71). A. M. ISIS

Landgraf, Erhard. Ein frühmittelalterlicher Botanicus. *Inauguraldissertation.* (Aus dem Institut für Geschichte der Medizin an der Universität Leipzig.) 35 p., 1 fig. 1928. ISIS

« Die aus dem 9. Jahrhundert stammende Handschrift 217 der Stiftsbibliothek St. Gallen enthält ein Rezeptbuch, das, wie aus dem Explicit hervorgeht, als *Botanicus* bezeichnet ist und das in 62 Kapiteln die medizinische Verwendungsweise von ebensovielen Pflanzen angibt. Die einzelnen Kapitel sind in der Weise angeordnet, dass als Ueberschrift der Name der betreffenden Pflanze steht und zwar in der aus den Handschriften des *Herbarius* des Pseudo-APULEIUS bekannten eigenartigen Form : Nomen herba. Dann folgt in der Regel eine kurze Standortsangabe eingeleitet mit nascitur. Bei einigen wenigen Pflanzen sind auch einzelne Synonyme angegeben. Darauf folgen die verschiedenen Rezepte mit der Indikation als Ueberschrift. » The text is edited, its sources discussed, and it is compared with the Pseudo-APULEIUS. Out of 62 chapters of the *Botanicus*, more than half, 36, derive from Pseudo-APULEIUS, but the 26 others are entirely independent of it, and, indeed, of any other known source. Many of the plants dealt with in these original chapters, are Alpine plants, e.g., « Ginciana » of which it is said « Nascitur in excelsis montis iuxta aquas, in montanis excelsis ubi et tora et uaradros et sistra et iuuitillus. » On the other hand the Apuleian chapters omitted refer to plants which were foreign or probably unknown to the herbalist. The latter thus showed a remarkable amount of originality. He was probably a resident of St. Gall or of the southern Alps. He is the Botanicus quoted

by SIMON JANUENSIS. The unique MS. was meant to be illustrated, but the illustrations were not added, except a poor one. G. S.

Nahawendi, Benjamin (*Introduction*, vol. 1, 550). Of NAHAVENDI a Hebrew code was printed in Gozloff, 1836. There is an exhaustive article on him by POZNANSKI in the Hebrew Encyclopaedia Ozar Yisrael III, 126-29. The statement that he completed the foundation of Karaism is rather broad. The third of the leading Karaites of the early period, DANIEL AL QUMISI, is missing. A. M. ISIS

(al-Qâsim ibn Ibrâhîm al-Ḥasanî, d. 860-61). La lotta tra l'Islam e il Manicheismo. Un libro di IBN AL-MUQAFFA contro il Corano confutato da AL-QÂSIM B. IBRÂHÎM. Testo Arabo publicato con introduzione, versione italiana e note da MICHAELANGELO GUIDI. XXVIII + 127 p. Roma, *R. Accademia Nazionale dei Lincei*, 1927. ISIS

Arabic text with Italian translation and notes of the Kitâb al-radd 'alâ-l-zindîq al-la'în IBN AL-MUQAFFA'. This IBN AL-MUQAFFA' is the great translator from Pahlawî into Arabic, who was executed in 757-58 (see SARTON's *Introduction*, vol. 1, 540). G. S.

Secretum secretorum (*Introduction*, vol. 1, 557). The Hebrew version of the Secretum Secretorum was published with English translation by M. GASTER, reprinted from *JRAS*, October 1907 and January and October 1908. To the criticism of the book itself S. HOROVITZ, Die Pseudo-Aristotelische Politik, *MGWJ*, 48, 257-74, is to be added. A. M. ISIS

Vonderheyden, M. La Berbérie orientale sous la dynastie des BENOÛ'L-ARLAB (800-909). 342 p., carte. Paris, GEUTHNER, 1927 (75 frs.). ISIS

This work deals mainly with political matters and social organization, but one chapter is devoted to « the men of science and religion » (p. 109-158). During that century of Aghlabid rule in Tunis, the main intellectual center was al-Qairawân (French, Kairouan), which became far more important than the old capital Tunis (near Carthage). To appreciate the interest of this study, it will suffice to recall that Tunis was then one of the main crossroads of the world, half way between Syria and Spain, and half way between Italy and the desert. Most of the leaders, learned men, and craftsmen came from Khurâsân or 'Irâq, and thus eastern influences were far stronger than the western. In the ninth century, Ifrîqîya was already deeply Islamized, except for some mountainous districts. G. S.

IXth Century (second half).

al-Ya'qûbî (*Introduction*, vol. 1, 607). M. KLAMROTH, Ueber die Auszüge aus griechischen Schriftstellern bei JAQUBI, appeared in *ZDMG*, 40, 189-233, 612-638; 41, 415-42; 42, 1-44, 1888. A. M. ISIS

Xth Century (whole and first half).

Hebrew Scriptures (*Introduction*, vol. 1, 624). About the Massora' see PAUL KAHLE in H. BAUER and P. LEANDER, *Historische Grammatik der hebr. Sprache des A. T.*, I, p. 71 ff. Halle, 1918. For the Oriental tradition see KAHLE, *Masoreten des Ostens*, 1913; *Die hebr. Bibel-Handschriften aus Babylonien*, 1928. According to KAHLE in *Masoreten des Ostens*, p. XVI, BEN NAPHTALI follows the Western, not the Babylonian tradition. On the other hand, M. GASTER, *A Codex of the Bible*, according to the Masora of BEN NAPHTALI and the Oriental tradition, *PSBA*, 1917, p. 73-84, 141-51 and 172-83, follows the opposite view. KAHLE is going to discuss BEN NAPHTALI thoroughly in his forthcoming Masoreten des Westens II.

For BEN ASHER, S. BAER and H. L. STRACK, *Die Dikduke ha-Teamin des Aharon ben Moscheh ben Ascher*, Leipzig, 1879, ought to be mentioned. Other texts of his are printed in C. D. GINSBURG's colossal but uncritical « *The Massorah* », I-IV, London, 1881-1905 and his introduction to the Massoretico-critical edition of the Hebrew Bible, 1897. A. M. ISIS

Isḥaq al-Isrâ'îlî (*Introduction*, vol. 1, 640). Add under Criticism: STEINSCHNEIDER, Arab. Lit., p. 38-45 and J. GUTTMANN, Ueber die Unechtheit der dem Israeli beigelegten Schrift « Sitte der Aerzte », *MGWJ*, 63, p. 156-64. A. M. ISIS

al-Qirqisânî (*Introduction*, vol. 1, 626). I. FRIEDLAENDER, Qirqisandi's Polemik gegen den Islam, *Z. A.*, 26, p. 93-110, 1911. HARKAVY's Russian publication of the first part of QIRQISANI's book also ought to have been mentioned. A. M. ISIS

Saadia ben Joseph (*Introduction*, vol. 1, 627). SAADIA was born in 882, as has been shown recently. His polemics against the Biblical criticism of HIWI of Balkh, edited by I. DAVIDSON, deserves mention. For D. J. Engelkempfer read W. ENGELKEMPER. Instead of A. Eckstein in the second line from bottom read « EPSTEIN ». BACHER corrected somewhere this mistake of the Encyclopaedia. A. M. ISIS

Xth Century (second half).

Buzurg ibn Shahriyâr. The book of the marvels of India. From the Arabic by L. MARCEL DEVIC. Translated into English by PETER QUENNELL. (The Golden Dragon Library.) VI + 164 p., London, ROUTLEDGE, 1928. ISIS

David ben Abraham (*Introduction*, vol. 1, 690). An edition of DAVID

BEN ABRAHAM's Dictionary is being prepared by Dr. SKOSS of Philadelphia and is to appear, c. 1932. A. M. ISIS

Donnolo (*Introduction*, vol. 1, 682). DONNOLO was the family name of the man. STEINSCHNEIDER printed the medical text in 1867 and added it to a reprint from VIRCHOW's *Archiv*, volumes 37-42, in 1868. In the *Archiv*, 38, p. 69, you will find the information you ask for as to his education and sources. NEUBAUER, Un chapitre inédit de SABBATAI DONNOLO, *REJ*, 22, 1891, p. 214-18. In this text the year 982 is mentioned by the author as the current one. A. M. ISIS

Dunash ben Labraṭ (*Introduction*, vol. 1, 690). DUNASH empirically recognized some of the roots, but did not recognize the system of tri-literality of Hebrew roots. The statement that he anticipated some of the grammatical reforms of HAYYUJ is therefore only partly correct. The authenticity of his criticism of SAADIA has been contested by N. PORGES in KAUFMANN-Gedenkbuch. A. M. ISIS

Ḥasdai ibn Shaprut (*Introduction*, vol. 1, 680). AKRISH's publication includes not only the answer of the king of the Khazars, but also HASDAI's letter. HARKAVY who published another considerably different version of the king's letter in *Meassef Nidahim*, nr. 8, St. Petersburg, 1879, p. 117-22, gave the best translation: Ein Briefwechsel zwischen Cordova und Astrachan zur Zeit Swjatoslaw's (um 960), *Russische Revue*, 6, 1875, p. 65-97; cfr. *ib.*, 11, 143-67, Die Schicksale des chasarischen Briefwechsels, and a criticism of CASSEL's translation of 1876. See also STEINSCHNEIDER, Geschichtslit. der Juden, I, Frankfurt, 1905, p. 19-20.

S. SCHECHTER, An unknown Khazar document, *JQR*, *NS.*, 3, 181-219. This very different text has been taken by various scholars also to be a letter by the Khazar King. On this text several publications have appeared in Russian. A. M. ISIS

Ḥayyuj (*Introduction*, vol. 1, 691). Fragments of his fourth book, Kitab al-nutaf, were edited by KOKOWZOFF, with a long Russian introduction, in 1916. It is more correct to speak of his grammatical essays, than of a Hebrew grammar. NUTT's edition contains also the Arabic original of the treatise on punctuation. A. M. ISIS

Ibn abî Ya'qûb al-Nadîm (*Introduction*, vol. 1, 662). See STEINSCHNEIDER's Arab. Uebersetzungen aus dem Griechischen, Beiheft 5 zum *Centralblatt für Bibliothekswesen*, 1889, p. 8-10. A. M. ISIS

Ibn al-Jazzâr (*Introduction*, vol. 1, 682). Steinschneider, Constantinus liber de gradibus, und Ibn al Gezzar *adminiculum*, *Deutsches Archiv für Geschichte der Medizin*, 2, 1-22. A. M. ISIS

Maslama ibn Aḥmad al-Majrîṭî. Article by E. Wiedemann in *Encyclopaedia of Islam*, vol. 3, 96-97, 1928. ISIS

Menahem ben Saruq (*Introduction*, vol. 1, 690). Menahem's Dictionary has no translation; the additions and corrections from a Ms. published by D. Kaufmann, *ZDMG*, 40, 367-409, ought to have been mentioned. A. M. ISIS

Sahl ben Mazliaḥ (*Introduction*, vol. 1, 690). The statements are not correct as the article on which they are based is « written without any special knowledge of the subject » (Poznanski). A. M. ISIS

Sei Shônagon. Les notes de l'oreiller, trad. du japonais avec une introduction par Kuni Matsuo et Steinilber-Oberlin. 166 p. Paris, Stock, 1928. ISIS

Sei Shônagon. The pillow-book. Translated by Arthur Waley. 162 p. London, Allen and Unwin, 1928. ISIS

Suidas. Lexicon edidit Ada Adler. Pars I. (*Lexicographi Graeci recogniti et apparatu critico instructi.*) xxxii + 549 p. Leipzig, Teubner, 1928. ISIS

Reviewed by U. von Wilamowitz-Moellendorff, *Deutsche Literaturzeitung*, 5, 2156-58, 1928.

XIth Century (whole and first half).

Asín Palacios, Miguel. Abenházam de Córdoba y su historia crítica de las ideas religiosas. Tomo segundo, 398 p. (Real Academia de la Historia). Tip. de la « Rev. de Archivos, Bibliotecas y Museos», Madrid, 1928. ISIS

The first volume of this monumental study of the greatest Muslim theologian of Spain, Ibn Ḥazm, appeared in 1927 (*Isis*, 11, 168). The second volume is devoted to Ibn Ḥazm's main work, his history of religions, the *Fiṣal* (*Kitâb al-milal wal-niḥal*, see my *Introduction*, vol. 1, 713), the main work of its kind in mediaeval times. It contains an elaborate introduction, which is essentially a development of Don Miguel's inaugural address before the Historical Academy of Spain (1924; *Isis*, 11, 421). Then follows the translation of the first treatise of the *Fiṣal*. I may recall that a partial English translation of the same work was published by Friedländer in the *Journal of the American Oriental Society* (vols. 28-29, 1907; *Isis*, 4, 63). Don Miguel is admirably equipped to translate and discuss this fundamental work; we

shall look with impatience to the continuation of this publication and hope that it will be duly completed by the indispensable indices and glossaries.
G. S.

Forsey, George Frank. BYRHTFERTH's preface. *Speculum*, 3, 505-22, 2 pl., 1928. ISIS

Ibn Gabirol (*Introduction*, vol. 1, 704). A complete critical edition of his poems is published by RAVNITZKI and BIALIK in Jerusalem. Two volumes and part of the third have appeared ; the final part is in press. (Nov. 1928). A. M. ISIS

Ibn Ḥazm (*Introduction*, vol. 1, 713). I. FRIEDLAENDER, Zur Komposition von IBN HAZM's *Milal va'n-nihal*, in *Orientalische Studien*, NÖLDEKE gewidmet, 267-77, 1906. A. M. ISIS

Ibn Janâḥ (*Introduction*, vol. 1, 736). It might be stated that IBN JANAH wrote the first comprehensive Hebrew grammar over which no real progress was made till the nineteenth century. Line 8, read « his main philological work ». Under Criticism BACHER's Leben und Werke des ABULWALID would be more in place than his « Aus der Schrifterklärung ». A. M. ISIS

Ibn Sînâ. De congelatione et conglutinatione lapidum. Being sections of the Kitâb al-shifâ'. The Latin and Arabic texts edited with an English translation of the latter and with critical notes by E. J. HOLMYARD and D. C. MANDEVILLE. IX + 86 p. Paris, PAUL GEUTHNER, 1927. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 134-5, 1928, and by ALEXANDER MARX, *Speculum*, 3, 596-97, 1928.

Ibn Sînâ (*Introduction*, vol. 1, 712). LANDAUER's work quoted on line 9, does not belong under « criticism ». It contains an Arabic text with German translation. A. M. ISIS

Marx, Alexander. GABIROL's authorship of the « Choice of Pearls » and the two versions of JOSEPH QIMḤI's « Sheqel haqodesh ». *Hebrew Union College Annual*, 4, 433-48 (s.a.). ISIS

GABIROL's claim to authorship of the Choice of Pearls, which rests on an authentic statement of JOSEF QIMḤI, finds welcome support from the examination of the text itself.

Samuel ha-Levi (*Introduction*, vol. 1, 704). KOKOWZOFF's edition of ḤAYYUJ's Kitab al-nutaf (1916, with Russian introduction) contains a fragment of SAMUEL HA-NAGID's « Book of Riches », which was

a dictionary. Comp. also S. POZNANSKI, Les ouvrages linguistiques de SAMUEL HANAGID, *REJ*, 57, 253-67; 58, 183-88, 1909. HARKAVY's edition of his poems ought to have been mentioned. HARKAVY also published the first part of an elaborate Hebrew biography. A. M. ISIS

XIth Century (second half).

Ahimaaz (*Introduction*, vol. 1, 776). D. KAUFMANN, Gesammelte Schriften, 3, p. 1-55, Frankfurt a.M., 1915. A. M. ISIS

Alfasi (*Introduction*, vol. 1, 751). ALFASI never was in Kairwan, as far as we know. His code appeared for the first time in Constantinople, 1509; the edition you mention is the fifth. All the old editions have the commentaries which were omitted in the few late ones. The Jewish Theological Seminary of America owns a few leaves of ALFASI's Halakot without commentary printed in Spain before the expulsion. Like many other printed books, this was destroyed by the Inquisition and no copy has survived. A. M. ISIS

Joshua ben Judah (*Introduction*, vol. 1, 751). For JOSHUA BEN JUDAH see STEINSCHNEIDER, *Arab. Lit.*, p. 91-94; G. MARGOLIOUTH, The writings of ABU 'L FARAJ HARUN, *JQR*, 11, 187-215, 1899; M. SCHREINER, JESCHU'A BEN JEHUDA, 1900. Das Buch von den verbotenen Verwandschaftsgraden des JESCHUA BEN JEHUDA was published by MARKON, 1908. A. M. ISIS

Lowe, James H. RASHI on the Pentateuch. Genesis. Translated and annotated in 8 parts. Part I. 64 p. (No. 2 of Lowe's series of Tutorial preparations for Rabbinics.) London, Hebrew Compendium Publishing Company, 1928. ISIS

« The object of this work is not only to justify its title as a « tutorial preparation » for the proper understanding by Jew and non-Jew of the premier Jewish Bible commentary, but also to facilitate the observance by the Jew of the Rabbinical Law and traditional custom to read the current weekly Bible portion in triplicate. »

Somadeva. The ocean of story. Being C. H. TAWNEY's translation of SOMADEVA's Katha Sarit Sagara. Now edited with introduction, fresh explanatory notes and terminal essay. By N. M. PENZER, Vol. 10, 368 p., appendixes and index. London, SAWYER, 1927. ISIS

Reviewed by M. GASTER, *Journal of the Royal Asiatic Society*, 946-47, 1928.

XIIth Century (whole and first half).

Conant, Kenneth John. Mediaeval academy excavations at Cluny, the season of 1928. *Speculum*, 4, 3-26, 7 pl., 1929. ISIS

The building of the abbey was begun in 1088 and virtually completed in 1109 (not 1118 as I said in my *Introduction*, vol. 1, 625). «Once the inspiration of Cluny is recognized, and its activity between 1088 and 1109 admitted, the flowering of Burgundian art and architecture which followed the closing of its chantier early in the twelfth century needs no further explanation.»

Levy, Raphael. The astrological works of ABRAHAM IBN EZRA, a literary and linguistic study with special reference to the old French translation of HAGIN. (The Johns Hopkins Studies in Romance Literatures and Languages, 8) 172 p. Baltimore, JOHNS HOPKINS Press, 1927. ISIS

Reviewed by ALEXANDER MARX, *Romania*, 54, 136-8, 1928. See *Isis*, 11, 171.

Manitius, Max. Zu PETRUS' VON CLUNI patristischen Kenntnissen. *Speculum*, 3, 582-87, 1928. ISIS

Otto of Freising. The two cities. Translated in full by CHARLES CHRISTOPHER MIEROW, New York City, Columbia University Press, 1928. ISIS

XIIth Century (second half).

Jansen, Wilhelm (*editor*). Der Kommentar des CLARENBALDUS VON ARRAS zu BOETHIUS' De trinitate, ein Werk aus der Schule von Chartres im 12. Jahrhundert. Aus der Handschr. zum 1. Male hrsg. und untersucht. (*Breslauer Studien zur historischen Theologie*, Bd. 8). XX + 270 p. Breslau, MÜLLER, 1926. ISIS

Reviewed by REINHOLD SEEBERG, *Deutsche Literaturzeitung*, 5, 1948-51, 1928.

XIIIth Century (whole and first half).

Asín Palacios, Miguel. El místico murciano ABENARABI (Monografías y documentos) IV. Su teología y sistema del cosmos. (Extracto del *Boletin de la Real Academia de la Historia.*) 102 p., Madrid, 1928. ISIS

The first three instalments of this fundamental study have been analyzed in *Isis*, 11, 425. This fourth one is an elaborate analysis of IBN 'ARABÎ's theological and metaphysical views. Many extracts from the original texts are translated in DON MIGUEL's study. IBN 'ARABÎ has not given us a synthesis of his philosophy, either in the Futûḥât or in the Fuṣûṣ, but the attempt was made by a commentator of the first half of the fourteenth century, 'ABD AL-RAZZAQ AL-QÂSHÂNÎ. This synthesis is translated at the end of the present memoir (p. 98-102). I hope that the author will eventually give us an index covering the whole series and a glossary of the many Arabic terms which are discussed. G. S.

Dept, Gaston G. Les influences anglaise et française dans le comté de Flandre au début du XIII^e siècle. (*Université de Gand. Recueil de travaux publiés par la faculté de philosophie et lettres.* 59^e fascicule). 226 p. Gand, VAN RYSSELBERGHE, 1928. ISIS

Very elaborate study of the French and English influence and of their intrigues in Flanders from 1202, when BALDWIN IX started for the Holy Land, until the treaty of Melun in 1226. G. S.

(Ibn Ḥammâd). Histoire des rois 'Obaïdides (les Califes fatimides). Éditée et traduite par M. VONDERHEYDEN. (*Publications de la Faculté des lettres d'Alger*, III^e série, textes relatifs à l'histoire de l'Afrique du Nord. Fascicule 2). 100 + 64 p. Paris, GEUTHNER, 1927. (20 frs.). ISIS

ABÛ 'ABDALLÂH MUḤAMMAD IBN 'ALÎ IBN ḤAMMÂD, born at Bû-hamra, c. 1150; studied in the Qala'a of the BANÛ ḤAMMÂD, then in Bougie and other places; was qâḍî in Algesiras and Salé, and died in 1230. He wrote a chronicle of Bougie, and, in 1220, a brief history of the Fâṭimid rule in Africa (909-1171), Akhbâr mulûk Banî 'Ubaid wa sîratuhum, of which the present volume contains the first edition and the first complete French translation. IBN ḤAMMÂD's account is valuable, in spite of its brevity, because it is one of the earliest and because of its first-hand references to local conditions. G. S.

Kantorowitz, Ernst. Kaiser FRIEDRICH DER ZWEITE. Zweite unveränderte Auflage. 652 p. Berlin, BONDI, 1928. ISIS

Pullè, Giorgio, (*edit.*) Viaggio a' Tartari di frate GIOVANNI DA PIAN DEL CARPINE (Historia Mongalorum). (*Viaggi e scoperte di navigatori ed esploratori italiani*, 5.) 3 p. l., 340 p., illus., 12 pl. (incl. maps). Milan, ALPES, 1929. ISIS

See: RINALDO CADDEO. Le navigazioni atlantiche di ALVISE DA CÀ DA MOSTO, ANTONIOTTO USODIMARE e NICCOLOSO DA RECCO. J. K. W.

Sabatier, Paul. Le Speculum perfectionis ou Mémoires de Frère LÉON sur la seconde partie de la vie de SAINT FRANÇOIS D'ASSISE. Tome I., Texte latin. (*British Society of Franciscan Studies*, vol. 13). XXXII + 350 p. Manchester, University Press, 1928. ISIS

Reviewed by W. E. LUNT, *American Historical Review*, 34, 381-83, 1929.

Vetter Quido. Nota alla risoluzione dell' equazione cubica di LEONARDO PISANO. *Atti R. Acc. scienze*, Torino, 63, 296-99, 1928. ISIS

Vetter, Quido. Note concerning the solution of a cubic equation in LEONARDO PISANO's Flos (in Czech). *Časopis pro Pěstovani Matematiky a Fysiky*. 58, 1-3, Prague, 1928. ISIS

VETTER shows that LEONARDO could have found a root of the equation $x^3 + 2x^2 + 10x = 20$ by means of the regula falsi. G. S.

Waters, E. G. R. A thirteenth century algorism. *Isis*, 11, 45-84, 1 pl., 1928. ISIS

« The present treatise, one of the earliest in any vernacular, to which my attention was called by Dr. HERBERT CRASTER of the Bodleian Library, is of real importance from both the philological and the scientific point of view. It does not follow any of the known treatises. In many respects there is closest similarity to the Carmen de Algorismo of VILLA DEI. However, in many parts SACROBOSCO's treatise is followed, while several points correspond to the text of the thirteenth century Codex in the Salem Cloister which was transcribed by MORITZ CANTOR. » Diplomatic edition with English version, notes and glossary. G. S.

XIIIth Century (second half).

Allulli, Ranieri, (*edit.*) Il Milione di MARCO POLO. (*Viaggi e scoperte di navigatori ed esploratori italiani*, 4.) 361 p., pls., maps. Milan, ALPES, 1928. ISIS

See : RINALDO CADDEO : Le navigazioni atlantiche di ALVISE DA CÀ DA MOSTO, ANTONIOTTO USODIMARE e NICCOLOSO DA RECCO. J. K. W.

Bacon, Roger. Answer nº 6 by DUNCAN B. MACDONALD, *Isis*, 11, 127, 1928. ISIS

Bacon, Roger. The Opus Majus. A translation by ROBERT BELLE BURKE. 2 vols. XIV + 840 p., 8 pls. Philadelphia, University of Pennsylvania Press, 1928. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 138-41, 1928; by LYNN THORNDIKE, *Speculum*, 3, 600-02, 1928.

Budge, Sir E. A. Wallis. The monks of KUBLAI KHÂN, emperor of China : or The history of the life and travels of RABBAN SÂWMÂ, envoy and plenipotentiary of the Mongol Khâns to the kings of Europe, and MARQÔS who as MÂR YAHBH-ALLÂHÂ III became patriarch of the Nestorian Church in Asia. Translated from the Syriac. XVI + 335 p., 16 pls., 6 illus., index. London, Religious Tracts Society, 1928. ISIS

Grabmann, Martin. Der Einfluss ALBERTS DES GROSSEN auf das mittelalterliche Geistesleben. *Zeitschr. für kathol. Theol.*, 25, 153-182, and 313-356, 1928. ISIS

Grabmann, Martin. Ein ungedrucktes Lehrbuch der Psychologie des PETRUS HISPANUS (Papst JOHANNES XXI, gest. 1277) im Cod. 3314

der Biblioteca Nacional zu Madrid. *Spanische Forschungen der Görresgesellschaft*. 1. Band. Gesammelte Aufsätze zur Kulturgeschichte Spaniens. p. 166-173, Münster i. W., ASCHENDORFF, 1928. ISIS

« Nunmehr fand ich auf meiner spanischen Bibliotheksreise im Oktober 1927 im Cod. 3314 der Biblioteca Nacional zu Madrid ein grosses Werk des PETRUS HISPANUS *De anima*, eine bisher ganz unbekannte, in der philosophiegeschichtlichen Literatur meines Wissens nirgends erwähnte gewaltige selbständige systematische Darstellung der Psychologie, wohl die inhaltlich bedeutendste literarische Leistung unseres Scholastikers und eine der grössten, wenn nicht die grösste monographische selbständige Darstellung der Seelenlehre in der Scholastik des 13. Jahrhunderts. Die Psychologie wurde in dieser Zeit teils in *Opuscula*, in Monographien wie von DOMINIKUS GUNDISSALINUS, WILHELM VON AUVERGNE, SIGER VON BRABANT u. a., teils in Kommentaren zur aristotelischen Schrift *De anima*, teils in *Quaestiones disputatae* wie von THOMAS VON AQUIN, MATTEO D'ACQUASPARTA, BERNHARD VON TRILIA u.a. dargestellt. Das Werk *De anima* des PETRUS HISPANUS reiht sich in die Kategorie der monographischen Darstellungen der Psychologie ein und nimmt nach Umfang und Inhalt das Interesse des Philosophiehistorikers in Anspruch. »... « Der dreizehnte und letzte Traktat des ganzen Werkes ist philosophiegeschichtlichen Inhalts und handelt in acht Kapiteln 'de antiquorum opinionibus circa animam'. PETRUS HISPANUS sieht in der Psychologie der griechischen und arabischen Philosophie keineswegs etwas absolut Fertiges und Vollendetes, das nur zu repristinieren wäre, ei bemerkt vielmehr, dass 'in antiquorum sermonibus circa animam non ad plenum veritatis apex ac profunditas attingitur (fol. 66r), anerkennt aber, dass 'ad aliquam partem' dieses Ideal von diesen Philosophen erreicht sei und dass es entsprechend sei 'eorum sententias benigno animo amplecti'. Eine derartige Heraushebung und gesonderte Behandlung der philosophiegeschichtlichen Partien ist in der scholastischen Literatur ohne Zweifel eine Seltenheit. PETRUS HISPANUS gliedert diesen ideengeschichtlichen Traktat nicht nach Persönlichkeiten, nach einzelnen Philosophen, sondern nach inhaltlichen Gesichtspunkten. Er führt die verschiedenen psychologischen Theorien und Richtungen und Gruppen vor. Diese Formen und Gesichtspunkte der Erklärung des Seelenlebens sind die Ableitungen des ganzen Seelenlebens aus der Bewegung, aus dem Willensleben (voluntaristische Psychologie), aus der Erkenntnis (intellektualistische Psychologie), aus beiden, aus physischen Prinzipien (per principia naturalia), aus mathematischen Prinzipien (per principia mathematica), und schliesslich aus der Harmonie (per harmoniam). Ein kurzes Schlusskapitel handelt de huius scientie (de anima) nobilitate. »

Hartig, Paul. ALBERT DER GROSSE und THOMAS VON AQUINO. Untersuchung zur Bedeutung volksheitlicher Verwurzelung im Mittelalter. *Deutsche Vierteljahrsschrift für Literaturwissenschaft und Geistesgeschichte*, 5, 25-36, 1927. ISIS

« Es kann keinem Zweifel mehr unterliegen, dass ALBERT DER GROSSE und THOMAS VON AQUINO in wesentlichen Zügen ihres Werkes tiefe Verschiedenheiten voneinander aufweisen, Verschiedenheiten, die es uns nicht mehr

erlauben, in THOMAS nur den grösseren Schüler seines grossen Meisters zu sehen, den Schüler, der seines Meisters Lehren zu innerer Einheit fortentwickelte und, von ihm ausgehend, das eine grosse System der mittelalterlichen Scholastik geschaffen hat. So liegt es nicht, so kann es nicht liegen; zu tief sind die Unterschiede der inneren Grundhaltung zwischen diesen beiden Führern der mittelalterlichen Scholastik. Führer waren sie beide, doch erst dann erfassen wir ihre Bedeutung richtig, und werden wir der Eigenart ihrer Werke und zugleich der geistesgeschichtlichen Entwicklung des Mittelalters gerecht, wenn wir in THOMAS VON AQUINO den Romanen erkennen lernen, in ALBERT DEM GROSSEN den Deutschen. »

McKeon, Richard. THOMAS AQUINAS' doctrine of knowledge and its historical setting. *Speculum*, 3, 425-44, 1928. ISIS

« The philosophic affinities in the flow of history are too strangely mixed to permit over-simple divisions into periods, or to justify discoveries of affinities, if the fundamental metaphysical postulates of systems be considered : THOMAS AQUINAS turned in the thirteenth century from a Platonist rationalism ; the modern revolt of the seventeenth century against scholasticism was a reaction from empiricism to rationalism ; and, to tighten the paradox, after SPINOZA and DESCARTES had criticized the imagination and had turned from the insufficiencies of knowledge based on sensation to the certainties of reason, the eighteenth century came with BAYLE, FONTENELLE, VOLTAIRE, the Encyclopaedists to call these metaphysical solutions vain imaginations and to turn from them to the certainties of reason. It would be difficult, on any criterion other than that of subject-matter, to know if AQUINAS is the beginning of modern philosophy, since AUGUSTINE may be made to father much of the seventeenth century, and the fourteenth century initiated critical tendencies much like those which grew out of the philosophy of HUME. A philosophic study of the development of philosophies should be content to seek out the bases and cogencies of philosophies rather than engage upon a nostalgic search for sympathetic doctrines, for the shifts and alterations of the subject of philosophic inquiry suggest, not that we are coming after centuries of inquiry to the truth and that we have at last left the false, but that the philosopher, like the poet and the scientist, takes for his subject what he will. »

Newbold, William Romaine (1865-1926). The cipher of ROGER BACON. Edited with foreword and notes by ROLAND GRUBB KENT. XXXII + 224 p., 33 pl. Philadelphia, University of Pennsylvania Press, 1928. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 141-45, 1928.

Ohm, Thomas (O.S.B.) Die Stellung der Heiden zu Natur und Uebernatur nach dem hl. THOMAS VON AQUIN. XII + 351 p. Münster i.W., ASCHENDORFF, 1927. ISIS

Reviewed by J. KOCH, *Deutsche Literaturzeitung*, 5, 2302-2303, 1928.

(Paris, Matthew). Four maps of Great Britain designed by MATTHEW PARIS about A.D. 1250, reproduced from three manuscripts in the

British Museum and one at Corpus Christi College, Cambridge. 11 p., 4 maps. London, Oxford University Press, 1928. ISIS

« Apart, perhaps, from early manuscript drawings from the geographical data of PTOLEMY the maps of MATTHEW PARIS are the earliest known detail maps of Britain. » Three of these have been frequently reproduced, but one (Brit. Mus. Cotton Ms. Julius D. VII, fol. 50^{v}-53) « has not previously been published in facsimile. » The reproductions are admirably executed in color and are accompanied by a brief explanatory text together with transcriptions of the legends and names appearing on the maps. Place names are also identified so far as possible. J. K. W.

Paton, Lucy Allen. Les prophécies de MERLIN : edited from Ms. 593 in the Bibliothèque Municipale of Rennes. 2 vol., XXXIX + 496-405 p. Published for the Modern Language Association of America, New York, D. C. HEATH, 1926. ISIS

Reviewed by J. S. P. TATLOCK, *Speculum*, 3, 416-17, 1928.

Polo, Marco. Il milione. Prima edizione integrale a cura di LUIGI FOSCOLO BENEDETTO sotto il patronato della città di Venezia (*Comitato Geografico Nazionale Italiano*, Pubblicazione N. 3). CCXVII + 283 p., ills., (part colored), index. Florence, LEO S. OLSCHKI, 1928. ISIS

Reviewed by J. K. WRIGHT, *Isis*, 11, 135-38, 1928.

Smith, David Eugene. Le comput manuel de MAGISTER ANIANUS. (*Documents scientifiques du XV^{e} siècle*, 4) 107 p., 32 illus. Paris, E. DROZ, 1928. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 385-87, 1928.

XIVth Century (whole and first half).

Benini, R. Il lago di Circonio (Palus Lugea degli antichi) nel disegno dantesco dell'inferno. *Rendiconti della R. Accademia Nazionale dei Lincei*, series 6, vol. 4, p. 3-14, 1928. ISIS

In describing the frozen lake of Cocytus in the lowest pit of the Inferno DANTE may have had in mind Lake Zirknitz (about 50 kilometers east of Trieste). J. K. W.

Cao, G. B. Il viaggio in Italia di un pellegrino inglese nel 1344. *Bollettino della Reale Società Geografica Italiana*, series 6, vol. 4, p. 476-96, 1927. ISIS

On the parts relating to Italy of Itinerarium cuiusdam anglici Terram Sanctam et alia loca sancta visitantis, recently published in full from a Ms. in Corpus Christi College, Cambridge, by GIROLAMO GOLUBOVICH in Vol. 4 of his Biblioteca biobibliografica della terra Santa e dell'Oriente Francescano, Quaracchi (near Florence).

Coulton, George Gordon. The Black Death. (BENN's Sixpenny Library, nº 46) 79 p. London, BENN, 1928. ISIS

Gilbert, Allan H. DANTE's conception of justice. VII + 244 p. Durham, N. C., Duke University Press, 1925. ISIS

Stephenson, J. The zoological section of the Nuzhatu-l-Qulûb. (a Persian compendium of science, 1340 A. D.) *Isis*, 11, 285-315, 1928. ISIS

Vetter, Quido. Note sulle equazioni di grado superiore in due manoscritti anonimi del Secolo XIV pubblicati da LIBRI. *Archivio di Storia della Scienza* (*Archeion*), 9, 175-6, 1928. ISIS

Wright, Jonathan. The foundations of science and religion in DANTE's debt to ARISTOTLE. *Annals of medical history*, 10, 417-28, 1928. ISIS

XIVth Century (second half).

Brown, Alfred. JOHN ARDERNE, surgeon of early England. *Annals of medical history*, 10, 402-8, 3 fig., 1928. ISIS

Kern, R. A. De reis van koning HAJAM WOEROEK door Lamadjang in 1359 A. D. *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, 44, 613-24, 1927. ISIS

XVth Century (whole and first half).

Longhena, Mario. Viaggi in Persia, India e Giava di NICOLÒ DE' CONTI, GIROLAMO ADORNO e GIROLAMO DA SANTO STEFANO. (*Viaggi e scoperte di navigatori ed esploratori italiani*, 6) 253 p., illus., 16 pl. (incl. maps). Milan, Alpes, 1929. ISIS

See: RINALDO CADDEO: Le navigazioni atlantiche di ALVISE DA CÀ DA MOSTO, ANTONIOTTO USODIMARE e NICCOLOSO DA RECCO. J. K. W.

Pinet, Marie-Josèphe. CHRISTINE DE PISAN, 1364-1430. Étude biographique et littéraire. (*Bibliothèque du XV^e siècle*). IX + 463 p. Paris, CHAMPION, 1927. ISIS

CHRISTINE DE PISAN was born at Venice in 1364. Her father was the famous physician and astrologer THOMAS PISANO and her mother was the daughter of THOMAS OF MONDINO, state counsellor. Soon after her birth, her parents moved to Bologna, but the father did not remain there very long being called to the court of CHARLES V, and c. 1368 the family was reunited in Paris. THOMAS PISANO died, c. 1384-89. In 1389, being only 25 year old, CHRISTINE found herself a widow and was obliged to earn a living for herself and her children. This she achieved with considerable

success by her abundant writings in verse and prose. She wrote chronicles of CHARLES V and of the revolution of 1413, and many didactic poems. Her scientific knowledge was mediocre. Her « Mutacion de fortume » (1404), a poem extending to about 24,000 lines, contains a classification of the sciences far more detailed than any found in other literary writings of her time. Her philosophy was derived from St. THOMAS and from ARISTOTLE's Metaphysics. She may have been the very translator of St. THOMAS's commentary on the Metaphysics. Her astrological views were derived from the same source and from DANTE. Her « Chemin de long estude » (1403), another poem (6392 lines), contains geographical lore derived from JOHN DE MANDEVILLE. She was essentially a moralist, a didactic poet, a feminist; not a woman of genius, yet a very intelligent and great one. Miss PINET's monograph is very elaborate. To quote her own words: « Si pour le psychologue et l'historien, il n'est pas sans intérêt de faire connaissance avec CHRISTINE et son œuvre, un intérêt plus grand s'attache à cette œuvre pour ceux qui se proposent de suivre l'évolution des idées et des formules littéraires. CHRISTINE est à une croisée de chemins. Elle nous promène dans le merveilleux jardin de GUILLAUME DE LORRIS, mais elle s'aventure déjà dans les bosquets chers aux poètes de la Renaissance. » G. S.

Valla, Laurentius. De falso credita et ementita CONSTANTINI donatione declamatio. Recensuit WALTHER SCHWAHN. XXIV + 82 p. Leipzig, TEUBNER, 1928. ISIS

Reviewed by PAUL PIUR, *Deutsche Literaturzeitung*, 5, 1955-57, 1928.

XVth Century (second half).

Charcot, J. B. CHRISTOPHE COLOMB vu par un marin. Préface de PAUL CHACK. 320 p., front., illus., maps. Paris, ERNEST FLAMMARION, 1928. ISIS

Charcot, the distinguished French Antarctic explorer, is an ardent admirer of COLUMBUS. He writes of this book: « destiné à l'homme de la rue et surtout aux jeunes, il fut écrit avec passion... Résultat de nombreuses lectures, c'est une compilation avouée et je nie toute prétention d'apporter un document nouveau. » Originality appears, however, in the emphasis laid on all questions of marine lore: ships, their construction and rigging; instruments of navigation, waves, ocean currents, winds, hurricanes, marine life. The volume is fully and attractively illustrated. J. K. W.

Gottschalk, Paul. The earliest diplomatic documents on America. The papal bulls of 1493 and the Treaty of Tordesillas reproduced and translated with historical introduction and explanatory notes. 91 p., 130 pl. (incl. maps). Berlin, PAUL GOTTSCHALK, 1927. ISIS

Reproductions of the original documents with transliterations, translations, and historical comments are given of the four bulls of ALEXANDER VI of 1493 by which the newly discovered lands were divided between Spain and Portugal, and of the Treaty of Tordesillas which established the famous line of demarcation. Reproductions are also supplied of the CANTINO

(1502-1504), SALVIATI (1525-57), and Weimar-Spanish (1527) maps, showing the demarcation line. J. K. W.

Hümmerich, Franz. Studien zum Roteiro der Entdeckungsfahrt VASCOS DA GAMA 1497-1499. *Revista de Universidade de Coimbra*, 10, 53-302, 1927. ISIS

These elaborate studies of the journal of VASCO DA GAMA's first voyage deal specifically with: (1) philological questions connected with a table of words and phrases in the Malayalam tongue (language of Calicut); (2) an appendix to the Roteiro relating to commercial and geographical matters which may have been written by a Jew GASPAR DA INDIA; (3) the authenticity of the Roteiro. Dr. HÜMMERICH concludes that «der Roteiro ist für die Reise der Jahre 1497-1499 in der Tat die 'fonte historica inilludivel'.» J. K. W.

Jeanselme, Edouard. Sur l'origine de la syphilis. *Rassegna di studi sessuali, demografia et eugenica*, 8, 57-64, 1928. ISIS

Magnaghi, Alberto. AMERIGO VESPUCCI. *Le vie d'Italia e dell' America latina*, 33, 531-547, illus., 7 maps, 1927. ISIS

Magnaghi, Alberto. I presunti errori che vengono attribuiti a COLOMBO nella determinazione delle latitudini. *Bollettino della Reale Società Geografica Italiana*, 5, 459-494, 553-582, 1928. ISIS

Scholars whose estimates of COLUMBUS have otherwise been highly favorable have attributed to the navigator surprising errors and ignorance in matters of navigation and cosmography, particularly in the determination of latitudes. Professor MAGNAGHI holds that this is unjust and that the errors in regard to latitude may be attributed to: (1) mistaken readings or imperfect understanding of documents; (2) deliberate falsification of scientific data by COLUMBUS for special reasons; (3) later attribution to COLUMBUS of statements and observations for which he was not responsible. J. K. W.

Morison, Stanley. German incunabula in the British Museum. One hundred and fifty-two facsimile plates of fine bookpages from presses of Germany, German Switzerland, and Austria-Hungary printed in the fifteenth century in Gothic letter and derived founts. With an introduction. 26 p. London, GOLLANCZ, 1928. ISIS

Norton, Thomas. The Ordinall of Alchimy by THOMAS NORTON of Bristoll. Being a facsimile reproduction from Theatrum Chemicum Britannicum with annotations by ELIAS ASHMOLE. With introduction by E. J. HOLMYARD. VII + 125 p. illus. London, EDWARD ARNOLD, 1928 (10s. 6d.). ISIS

According to his first editor, ELIAS ASHMOLE (1617-1692), THOMAS NORTON was an «alchymista suo tempore peritissimus, and much more curious in the studies of Philosophy than others, yet they pass some undecent and

abusive Censures upon him, with reference to this vaine and frivolous Science, as they are pleased to tearme it ». He wrote three alchemical treatises « the Ordinall of Alchimy, De Transmutatione Metallorum, and De Lapide Philosophico. Of these, the only one that has been published is the first, which is included in ASHMOLE's Theatrum Chemicum Britannicum (1652), and, in Latin, in MAIER's Tripus Aureus (1618), and MANGET's Bibliotheca Chemica Curiosa (1702). » G. S.

Phares, Simon de. Recueil des plus célèbres astrologues et quelques hommes doctes faict par SYMON DE PHARES du temps de CHARLES VIII^e^, publié d'après le manuscrit unique de la Bibliothèque Nationale par le Dr. ERNEST WICKERSHEIMER. XII + 307 p. Paris, CHAMPION, 1929. ISIS

This work, composed apparently in 1498, the last year of the reign of CHARLES VIII of France, consists of notices of a host of men who from the earliest times have devoted themselves more or less to astrology. Since, however, many of these men are also important names in the history of astronomy, mathematics, medicine and other sciences, the work is also an important original source for the historian of science. Heretofore it has been available only in a single French manuscript at the Bibliothèque Nationale of Paris and is now edited for the first time by Dr. WICKERSHEIMER. The notices, of course, become more reliable as SYMON DE PHARES approaches his own time. The value of the work is increased by a full index of names occupying over 30 pages in double columns. L. T.

Schevensteen, A. van. Les prescriptions hygiéniques et médicales à Anvers entre 1439 et 1496. *Annales de l'Académie royale d'archéologie de Belgique*, 4, 43-62, 1927. ISIS

Streicher, Fritz. Die Kolumbus-Originale. (Eine paläographische Studie.) *Spanische Forschungen der Görresgesellschaft*. 1. Band. Gesammelte Aufsätze zur Kulturgeschichte Spaniens, p. 196-250, 6 pl., Münster i. W., ASCHENDORFF, 1928. ISIS

Paleographic analysis of the various documents, annotations, etc., said to be autographs of COLUMBUS to determine or disprove their authenticity in order that a more sound foundation may be laid for future Columbian studies. J. K. W.

Vasconcellos, Ernesto de. A viagem do GAMA na evoluçao da cartografia nautica. *Boletim da Agencia Geral das Colónias*, 4, 6-14, 1928. ISIS

Wickersheimer, Ernest. Note sur JOHANNES ENGEL (ANGELI) d'Aichach, astrologue et médecin, mort à Vienne en 1512. Festschrift MAX NEUBURGER gewidmet, 316-22, Wien, 1928. ISIS

Leonardo da Vinci.

Baratta, Mario. LEONARDO DA VINCI e la Val di Chiana. *La Geografia*, 15 (5), p. 69-97, 1927. ISIS

Study of a series of manuscript maps made by LEONARDO of the Val di Chiana. J. K. W.

XVIth Century (whole and first half).

B. — *Physical Sciences and Technology.*

Darmstaedter, Ernst. Zur Geschichte des Äthers (Diäthyläthers). *Journal für praktische Chemie*, 120, 74-88, 1928. ISIS

The author of this paper has had the excellent idea of submitting to a chemical discussion the subject discussed from a more literary point of view by CHAUNCEY D. LEAKE : VALERIUS CORDUS and the discovery of ether (*Isis*, 7, 14-24, 1925) and by KARL SUDHOFF : VALERIUS CORDUS, der Äther und THEOPHRAST VON HOHENHEIM (TSCHIRCH-Festschrift, 1926 ; *Isis*, 10, 145). I quote two of his conclusions : « Wenn also VALERIUS CORDUS auch etwas Äther als Nebenprodukt erhalten haben kann, so hat er diesen Stoff, soweit die hier bearbeitete Schrift in Frage kommt, doch sicher nicht besonders beachtet, untersucht und verwendet. Wahrscheinlich hat CORDUS nicht einmal die Existenz dieses so sehr flüchtigen Stoffes bemerkt. » ... « Wenn nun auch die Annahme nahe liegt, dass PARACELSUS Äthyläther dargestellt und angewandt hat, so habe ich doch einige Bedenken, von denen der niedrige Siedepunkt des Äthers und die Frage, ob die Ätherdämpfe tatsächlich zur Kondensation kamen, mir besonders wichtig erscheint. Auf der anderen Seite scheint mir allerdings die kleine Stelle 'imbibiert, nachfolgent distillirt' auszusagen, dass das Alkohol-Schwefelsäuregemisch nicht wie bei CORDUS längere Zeit stehen gelassen, sondern *gleich destilliert* wurde, wobei sich tatsächlich — im Gegensatz zu der Vorschrift bei CORDUS — Äther bildete, vorausgesetzt, dass genügend Alkohol angewandt wurde. » G. S.

C. — *Natural Sciences.*

Almagià, Roberto. Note on a map of the British Isles by PIETRO COPPO. *The Geographical Journal*, 69, 441-444, 1927. ISIS

PIETRO COPPO (1469 or '70-1555 or '56) was author of a Cosmographia, known only in Ms., but « of great value for the history of geography in the sixteenth century. » The map of the British isles, here reproduced for the first time, dates from about 1525 and appears to have been based in part on a nautical chart and in part on data derived from PTOLEMY. J. K. W.

Caraci, Giuseppe. Un atlante sconosciuto di VESCONTE MAIOLLO (1548). *L'Universo*, 7, 749-743, 1926. ISIS

Cortes, Hernando. Five letters, 1519-1526. Translated by J. BAYARD MORRIS, with an introduction. XLVII + 388 p. London, ROUTLEDGE, 1928. ISIS

Eude, Emile. La lettre d'ANTONIO DE BRITO, capitaine de la forteresse de Ternate, au roi de Portugal DOM JOAO III° (6 mai, 1523). *La Géographie*, 49, 1-3, 1928. ISIS

French translation of a letter which « contient un récit abrégé de l'expédition de MAGELLAN, d'après la déposition (car il s'agit d'un véritable interrogatoire) de plusieurs témoins de la grande entreprise. » The letter was published in Algunos Documentos, Lisbon, 1892, a collection « presque introuvable en France. » J. K. W.

Feis, Oswald. Unbekannte Briefe von EUCHARIUS RÖSSLIN (Vater und Sohn). *Archiv f. Gesch. d. Med.*, 22, 102-04, 1929. ISIS

Giudici, Paolo (*editor*). Itinerario di LUDOVICO DE VARTHEMA, Bolognese, nello Egypto, nella Surria, nella Arabia Deserta et Felice, nella Persia, nella India et nella Etiopia. La Fede, el Vivere et Costumi de Tutte le Prefate Provincie. (*Viaggi e scoperte di navigatori ed esploratori italiani*, 2) 347 p., 13 pl. (incl. maps). Milan, ALPES, 1928. ISIS

See RINALDO CADDEO: Le navigazioni atlantiche di ALVISE DA CÀ DA MOSTO, ANTONIOTTO USODIMARE e NICCOLOSO DA RECCO. J. K. W.

Manfroni, Camillo (*editor*). Relazione del primo viaggio intorno al mondo di ANTONIO PIGAFETTA seguita del roteiro d'un pilota genovese. (*Viaggi e scoperte di navigatori ed esploratori italiani*, 3) 337 p., 20 pl. (incl. maps). Milan, ALPES, 1928. ISIS

See RINALDI CADDEO: Le navigazioni atlantiche di ALVISE DA CÀ DA MOSTO, ANTONIOTTO USODIMARE e NICCOLOSO DA RECCO. J. K. W.

Ricard, Robert. La côte atlantique du Maroc au début du XVI^e^ siècle d'après des instructions nautiques portugaises. *Hespéris*, 7, p. 229-258, 1927. ISIS

Translation of a part of the Esmeraldo de situ orbis of DUARTE PACHECO PEREIRA dating from c. 1506. J. K. W.

Roselli, Francesco. World map of FRANCESCO ROSELLI drawn on an oval projection and printed from a woodcut supplementing the fifteenth century maps in the second edition of the *Isolario* of BARTOLOMEO DALI SONETTI. Printed in Italy Anno Domini MDXXXII, described by GEORGE E. NUNN from the copy in the collection of GEORGE H. BEANS. 3 p. l. 30 p., front., pl., maps. Philadelphia, privately printed, 1928. ISIS

Four maps of the Florentine engraver ROSELLI are known; one of these is the map of 1506, on the conical projection, designed by MATTEO CONTARINI and published in 1924 by the British Museum (*Isis*, 7, 205, 206, 544; 10, 146). Two of the others are possibly the first maps of the world drawn

on the oval projection later used by ORTELIUS. « The geographical conception of the British Museum map of 1506 and of the oval ROSELLI is that of the Ptolemy-Marco Polo-Behaim school, just before the fourth voyage of COLUMBUS. According to the longitudes indicated, the claims of COLUMBUS to have reached the mainland of Asia and to have discovered the island of Cipango on his first voyage are apparently both rejected... It is apparently in the north Atlantic region alone that the ROSELLI maps made any compromise with the Asiatic claims of recent discoverers » (notably JOHN CABOT in regard to whose voyage of 1497 the ROSELLI maps « appear to be an important record supplementary to the LA COSA maps. ») These questions are analyzed in detail by Dr. NUNN. J. K. W.

Steffen, J. El supuesto primer descubrimiento de la cordillera patagónica desde el lado del Atlántico. *Revista Chilena de Historia y Geografia*, 58, p. 26-45, 1928. ISIS

STEFFEN attempts to disprove the thesis held by the nineteenth century German geographer, J. G. KOHL, that SIMON DE ALCAZABA in 1534 was the first to cross Patagonia and to discover the Andes in a southern latitude. ALCAZABA, in STEFFEN's opinion, merely penetrated to a distance of some 200 kilometers from the Atlantic coast. J. K. W.

Stevens, Henry N. The first delineation of the New World and the first use of the name America on a printed map. An analytical comparison of three maps for each of which priority of representation has been claimed (two with name America and one without) with an argument tending to demonstrate that the earliest in each case is the one discovered in 1893 and now preserved in the John Carter Brown Library at Providence, R. I. XVI + 127 p., 2 maps. London, HENRY STEVENS, Son and STILES, 1928. ISIS

Mr. STEVENS argues that a map of the world which was found in a copy of the 1513 Strassburg edition of PTOLEMY's Geography purchased by him in 1893 and later presented to the John Carter Brown Library, Providence R. I., and on which the name « America » appears, « was engraved at Nuremberg and printed there, probably as early as 1505 but not later than the early part of 1506. » If this is so, the map is not only « the earliest printed map yet known to show any part of the New World discoveries, » a distinction that has recently been claimed for the map of GIO. MATTEO CONTARINI of 1506 (*Isis*, 7, 205, 206, 544), but is also « the first printed map on which the New World discoveries are marked with the name America. » The map would seem to have been designed and prepared by MARTIN WALDSEEMÜLLER, whose famous World Map of 1507, discovered in 1901 by the Rev. JOSEPH FISCHER, S. J., has hitherto been regarded as the first map to bear the name « America. » See *Isis*, 12, 362. J. K. W.

Taylor, E. G. R. A regional map of the early XVIth century. *The Geographical Journal*, 71, 474-479, 1928. ISIS

MARTIN WALDSEEMÜLLER's map of the Upper Rhine Valley of Alsace in the Strasbourg edition of PTOLEMY's Geography of 1513 is of particular

interest because of its accuracy, which must have sprung from « much close personal study of the region itself, » and because of the clear manner in which the contrast between the flat floor of the rift valley and the adjacent uplands is brought out. J. K. W.

D. — *Medical Sciences.*

Achelis, J. D. Zur Grundstruktur der paracelsischen Naturwissenschaft. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 44-51, 1928. ISIS

Costa, Santos. Le traitement de la syphilis à l'Hôpital de la Toussaint, à Lisbonne, au commencement du XVI^e^ siècle. Festschrift MAX NEUBURGER gewidmet, 79-82, Wien, 1928. ISIS

E. — *Alia.*

Allen, John William. A history of political thought in the sixteenth century. XXII + 525 p. London, METHUEN, 1928. ISIS

Goulet, Robert. Compendium of the University of Paris, A. D. 1517. Done into English by ROBERT BELLE BURKE. Philadelphia, University of Pennsylvania Press, 1929. ISIS

Melanchthon, Philip. MELANCHTHONS Briefwechsel. Bd. I. 1510-1528. Hrsg. von OTTO CLEMEN (Supplementa Melanchthoniana. Werke PH. MELANCHTHONS, die im Corpus Reformatorum vermisst werden. Abt. VI) IX + 450 p. Leipzig, M. HEINSIUS Nachf., 1926. ISIS

Reviewed by W. KÖHLER, *Deutsche Literaturzeitung*, 5, 2493-95, 1928.

More, Sir Thomas (1478-1535). The dialogue concerning TYNDALE. Reproduced in black letter. Facsimile from the Collected edition (1557) of MORE's English works. Edited with a modern version of the same and an essay on the Spirit and doctrine of the dialogue by W. E. CAMPBELL. With an historical introduction and philol. notes by A. W. REED. XVIII + 288 p. (text); 444 p. (notes). London, EYRE and SPOTTISWOODE, 1927. ISIS

Reviewed by ALOIS BRANDL, *Deutsche Literaturzeitung*, 5, 2261-2265, 1928.

Vocht, Henry de. Literae virorum eruditorum ad FRANCISCUM CRANEVELDIUM, 1522-1528. A collection of original letters. Edited with notes and commentaries. Louvain, Librairie Universitaire, 1928. ISIS

XVIth Century (second half).

A. — *Mathematics.*

Shenton, Walter F. The first English EUCLID. *American Mathematical Monthly*, 35, 505-11, 8 fig., 1928. ISIS

« The first English translation of EUCLID's Elements to be printed was the one-hundredth piece of work of the famous English printer, JOHN DAY, and was issued in 1570. »

B. — *Physical sciences and Technology.*

Brahe, Tycho. Opera omnia. Edidit I. L. E. DREYER. Tomus 9, VIII + 352 p. Tomus 14, IV + 327 p. Hauniae, Libraria Gyldendaliana, 1927, 1928. ISIS

Reviewed by J. K. F., *Nature*, 122, 803, 1928.

C. — *Natural Sciences.*

Benson, E. F. Sir FRANCIS DRAKE. (The Golden Hind Series.) XVI + 315 p., front., 7 pl. New York, HARPER, 1927. ISIS

Bishop, R. P. Lessons of the GILBERT map. *Geographical Journal*, 72, 237-243, map, 1928. ISIS

A Ms. map recently purchased by Dr. ABRAHAM S. W. ROSENBACH bears the signature of Sir HUMPHREY GILBERT. The North Pole is in the center and easy passages by water are shown between Atlantic and Pacific around the Arctic coast of North America as well as by way of the St. Lawrence, which connects with the Gulf of California (Mare Vermeyio). The map makes clear the geographical concepts which lay behind contemporary English plans for colonization on the west coast of North America. The article is preceded by a brief anonymous note entitled The GILBERT Map of c. 1582-3. J. K. W.

Caraci, G. Tabulae geographicae vetustiores in Italia adservatae. Reproductions of manuscript and rare printed maps, edited and explained, as a contribution to the history of geographical knowledge in the period of the great discoveries. Vol. II. p. 16-48, pl. 21-41. Florence, OTTO LANGE, 1927. ISIS

Photogravure reproductions with accompanying text of an anonymous Italian Portolan Atlas (covering the coasts of the Old and New Worlds) now in the Biblioteca Angelica in Rome (MS. Fondo antico 1311) and of a large printed anonymous map of the New World now in the Museo Civico Correr in Venice, both dating from the second half of the sixteenth century. (Vol. I, see *Isis*, 9, 157). J. K. W.

Fordham, Sir Herbert George. The earliest tables of the highways of England and Wales, 1541-1561. *Transactions of the Bibliographical*

Society, (The Library) 349-354, 7 facs. London, Oxford University Press, 1927. ISIS

Fordham, Sir H. George. CHRISTOPHER SAXTON of Dunningley. His life and work. 28 p., front., pl., map. (Reprinted from the *Thoresby Society's Miscellanea*, vol. 28.) Leeds, JOHN WHITEHEAD, 1928. ISIS

SAXTON (born, 1542 or 1544; died certainly after 1606 and probably after 1610) is notable for his thirty-four county maps published in 1579 and for an important general map of England and Wales, subsequently much used, although no copy of an original impression has been preserved. SAXTON « laid a solid foundation in the science of land survey and map delineation and production. » J. K. W.

McFee, William. Sir MARTIN FROBISHER. XIII + 288 p. London, LANE, 1928. ISIS

Ortelius, A. A. ORTELII Catalogus Cartographorum. Bearbeitet von LEO BAGROW. Erster Teil (A-L). *Petermanns Mitteilungen*, Ergänzungsheft Nr. 199. 137 p., 12 pl., Gotha, JUSTUS PERTHES, 1928. ISIS

In his Facsimile-Atlas, A. E. NORDENSKIÖLD reprinted and commented upon the Katalogus auctorum which appears in the various editions of ABRAHAM ORTELIUS' famous atlas, Theatrum orbis terrarum. Since NORDENSKIÖLD's day our knowledge of sixteenth century maps and cartographers has been greatly enlarged. BAGROW aims to present systematically the essential facts regarding the lives and works of the eighty-seven cartographers listed in the 1570 edition of the Theatrum. The present volume covers those whose surnames begin with the letters A-L. When completed BAGROW's compilation will be an important work of reference. J. K. W.

Srbik, Robert. Die Darstellung Tirols auf der Deutschlandkarte des CHRISTIAN SCHROTT (SGROTHENIUS) 1565. *Mitteilungen der Geographischen Gesellschaft in Wien*, 70, 19-30, 127-144, 1927. ISIS

Staden, Hans. HANS STADEN: the true history of his captivity, 1557. Translated and edited by MALCOLM LETTS, with an introduction and notes. (*Broadway Travellers.*) XX + 191 p. London, ROUTLEDGE, 1928. ISIS

D. — *Medical Sciences.*

Baumann, E. D. JODOCUS LOMMIUS BURANUS. *Archiv f. Gesch. d. Med.*, 22, 60-71, 1929. ISIS

JOSSE LHOMME VAN BURREN was town physician in Tournay from 1554 on, was later in Brussels, and died presumably in Madrid, 1572. G. S.

Haberling, Wilhelm. Die Cinq Livres de Chirurgie des AMBROISE PARÉ (1572). Eine bibliographische Studie. Festschrift MAX NEUBURGER gewidmet, 150-59, 2 Abb., Wien, 1928. ISIS

Hult, O. T. Ein Wiener Arzt um die Mitte des 16. Jahrhunderts in Stockholm. Festschrift MAX NEUBURGER gewidmet, 192-97, Wien, 1928. ISIS

Apropos of JOHAN COPP ab Raumental, a Bohemian nobleman, physician to FERDINAND I in 1526, who came to Stockholm in 1555; died in or before 1564. G. S.

Hunger, F. W. T. BERNARDUS PALUDANUS (BERENT TEN BROECKE) 1550-1633. *Bijdragen tot de geschiedenis der geneeskunde*, 8, 325-33, 1928. ISIS

Robinson, Herbert Spencer. The Lumleian lectures before HARVEY. Introductory: CALDWELL, LUMLEY, and HOLINSHED. *Medical life*, 35, 583-89, 1928. ISIS

Walsh, James J. Two early American medical books. Festschrift MAX NEUBURGER gewidmet, 300-7, Wien, 1928. ISIS

Apropos of FRANCISCO BRAVO: Opera medicinalia (Mexico City, 1570) and AUGUSTIN FARFAN: Tractado breve de anothomia y chirurgia (Mexico City, 1579).

XVIIth Century (whole and first half).

A. — *Mathematics.*

Cajori, Florian. A revaluation of HARRIOT's Artis analyticae praxis. *Isis*, 11, 316-24, 1928. ISIS

Feldhaus, F. M. PASCAL. 6. Euklid-Feldhaus-Beilage zur Maschinen-Buchhaltung, Nr. 9, Sept. 1928, p. 21-4. 7. Euklid-Feldhaus-Beilage zur Maschinen-Buchhaltung, Nr. 10, Oct. 1928. p. 25-8, illus. ISIS

Kokomoor, F. W. The teaching of elementary geometry in the seventeenth century. *Isis*, 11, 85-110, illus., 1928. ISIS

Wieleitner, Heinrich. Zur Entstehung der analytischen Raumgeometrie. *Z. math. nat. Unt.*, 59, 357-58, 1928. ISIS

C. — *Natural Sciences.*

Anesaki, Masaharu. Geographical names in the records of Catholic

missions in Japan in the seventeenth century. *Proceedings of the Imperial Academy* (of Japan), 3, 1-5, 1927. ISIS

Baker, J. N. L. NATHANAEL CARPENTER and English geography in the seventeenth century. *Geographical Journal*, 71, 261-71, 1928. ISIS

CARPENTER, a Fellow of Exeter College, Oxford, was author of *Geographie delineated forth in two books*, Oxford, 1625. The first book deals with mathematical geography and « is very largely borrowed from the writings of others. » The second contains some original speculations on physical and human geography, for example : the denudation of mountains, the upbuilding of plains by sedimentary deposits, and the cliffing of coasts by marine erosion. In dealing with the relations of environment and man CARPENTER used Chapter V of the *Methodus ad facilem historiarum cognitionem* of JEAN BODIN, though he « did not slavishly follow his authority. » Although CARPENTER's influence on the subsequent development of geography in sixteenth century England was not great, he « deserves to be remembered for his caution, his common sense, and his skill and judgment in the use of authorities, which were in almost every case the best available. » J. K. W.

Boxer, C. R. A Portuguese embassy to Japan (1644-1647). Translated from an unpublished Portuguese MS., and other contemporary sources, with commentary and appendices. VIII + 64 p., 3 pl. London, KEGAN PAUL, 1928. ISIS

Chatterton, E. Keble. Captain JOHN SMITH. (*The Golden Hind* series, edited by MILTON WALDMAN). XII + 286 p., front., 3 pl., 3 maps, New York, HARPER, 1927. ISIS

Euwens, P. A. De oudste kaarten van het eiland Curaçao. *De West-Indische Gids*, 10, 97-126, 1926. ISIS

Discussion of seventeenth century maps of Curaçao. J. K. W.

Gage, Thomas (d. 1656). THOMAS GAGE, the English-American : a new survey of the West Indies, 1648. Edited with an introduction by ARTHUR PERCIVAL NEWTON. (*Broadway Travellers.*) XXXII + 407 p., 12 pl. London, ROUTLEDGE, 1928. ISIS

Harcourt, Robert. A relation of a voyage to Guiana, 1613 : With Purchas's Transcript of a report made at HARCOURT's instance on the Marrawini District. Edited with introduction and notes by Sir C. ALEXANDER HARRIS. (*The Hakluyt Society*, second series, nº 60) XII + 191 p., front., 3 maps. London, Hakluyt Society, 1928. ISIS

ROBERT HARCOURT (1574-1631) made two voyages to Guiana (in 1608-9 and in 1627) in an attempt to establish an English settlement. The *Relation*, first published in 1613 and here reprinted with notes and introduction, gives a general description of the country. « Not only regarding botany

and zoology but in respect of the agricultural and commercial value of the products of Guiana HARCOURT's treatise is more complete and businesslike than other accounts of the same period. » J. K. W.

Powys, Llewelyn. HENRY HUDSON. (*The Golden Hind* series, edited by MILTON WALDMAN.) XVI + 213 p., front., 5 maps, facsim. New York, HARPER, 1928. ISIS

Sokolovsky, G. N. Une page d'histoire des explorations en Asie Centrale. Le voyage du rev. p. FRANCISCO DE AZEVEDO. (In Russian with a French summary.) *Bulletin de la Société Russe de Géographie*, 60, 3-31, 1928. ISIS

Study of AZEVEDO's voyage based on text of letter of AZEVEDO (1587-1660) to ANTONIO FREIRE in Lisbon published in C. WESSELS' Early Jesuit Travellers in Central Asia. The Hague, 1924 (*Isis*, 7, 129-32). J. K. W.

Tresk, Olof. Kartor över Kemi och Torne Lappmarker, 1642 och 1643. Av trycket utgivna och tillägnade K. B. WIKLUND på 60-årsdagen 15. mars 1928 av vänner. Med en historisk inledning av NILS AHNLUND. 26 p., illus., 2 maps. Stockholm, 1928. ISIS

Fine reproductions of two seventeenth century maps of Lappmark with commentary in Swedish. J. K. W.

D. — *Medical Sciences.*

Allers, Rudolf. Des CLAUDIO AQUAVIVA Industriae ad curandos animae morbos. Festschrift MAX NEUBURGER gewidmet, 1-4, 1928. ISIS

CLAUDIO AQUAVIVA, duca d'Altri, was born at Altri in 1553; he was general of the Jesuits from 1581 to his death in 1615. His treatise Ad curandos animae morbos appeared in Rome, 1615. G. S.

Andel, M. A. van. Die Heilkunde der Eingeborenen Brasiliens in WILLEM PISOS Historia naturalis Brasiliae (1648). Festschrift MAX NEUBURGER gewidmet, 16-21, Wien, 1928. ISIS

Cohn, Alfred E. The development of the Harveian circulation. *Annals of Medical History*, 1, 16-36, 3 fig., 1929. ISIS

Garrison, Fielding H. BACON's relation to medicine. *Medical life*, 35, 561-66, 1928. ISIS

Harvey, William. The anatomical exercises: De motu cordis, 1628; De circulatione sanguinis 1649: the first English text of 1653 now newly edited by GEOFFREY KEYNES. 202 p. London, The Non-Such Press, 1928. ISIS

This neatly printed volume includes a new plate showing the celebrated

experiments on the veins of the arm which Doctor KEYNES had made especially for this edition. A book-collector's item. C. D. L.

Harvey, William. Exercitatio anatomica de motu cordis et sanguinis in animalibus. Frankfurt, 1628, facsimile reprinted by R. LIER, Florence, 1928. ISIS

A finely prepared facsimile from the University of Göttingen copy. The page and a half of errata are not included. The wide margins of the reprint give rather a false idea of the condition of the original as usually found. C. D. L.

Harvey, William. Tercentennial edition of Exercitatio anatomica de motu cordis et sanguinis in animalibus. With an English translation and annotations by CHAUNCEY D. LEAKE. XII + 154 p. Springfield, Illinois, CHARLES C. THOMAS, 1928; London, BAILLIÈRE, TINDALL, 1928 ($ 3.50). ISIS

This includes a facsimile of the original 1628 edition which has the page and a half of errata. This is the fourth English translation which has appeared and was designed to present HARVEY's classic not only in the vigorous style of the original but also in terminology that might be intelligible to modern biology students. There is appended a chronology of HARVEY's life and a brief analysis of the significance of his work. Evidence is advanced that the work was composed at several different periods in the author's career. The annotations accompany the text of the translation, and are indexed with the translation. G. S.

Harvey, William. Tercentenary of the publication of De Motu Cordis. ISIS

Various celebrations were arranged in many different places in the English speaking world to commemorate the tercentenary of the publication of HARVEY's *De Motu Cordis*. The outstanding event was that conducted by the Royal College of Physicians of London, May 14th and 15th, 1928. This is reviewed in the *Annals of Medical History*, 10, 498, Dec., 1928, and accounts are also given in the *British Medical Journal*, the *Lancet*, and the *Journal of the American Medical Association*. The College of Physicians of Philadelphia also made a special occasion in commemoration of HARVEY's work on March 22d and 23d, 1928. Many publications were elicited by the tercentenary of which a few of the more significant will be noted. The New York Academy of Medicine made a special exhibit of books, portraits and other material relating to HARVEY which are listed in the *Bulletin* of the Academy, vol. 4, second series, p. 906, Aug., 1928. C. D. L.

Keynes, Geoffrey. A bibliography of the writings of WILLIAM HARVEY, M. D., discoverer of the circulation of the blood. 67 p. Cambridge, University Press, 1928. ISIS

A beautifully printed and illustrated bibliography of HARVEY's own works. Not only are accurate collations given to all known editions, but libraries are noted where samples of each edition may be found. C. D. L.

Krumbhaar, E. B. Bibliographical matters pertaining to the discovery of the circulation of the blood. Based on the tercentenary exhibit of Harveiana by the College of Physicians of Philadelphia. *Annals of Medical History*, 1, 57-86, 6 fig., 1929. ISIS

MacLeod, J. J. R. HARVEY's experiments on circulation. *Annals of Medical History*, 10, 338-48, 8 fig., 1928. ISIS

An analysis of the physiological significance of HARVEY's work. C. D. L.

Malloch, Archibald. WILLIAM HARVEY. XI + 103 p. Reprinted from the *American Journal of Surgery*, new series 5, 1928. New York, PAUL HOEBER, 1929. ISIS

A review of the life, works, and influence of HARVEY, with thirteen illustrations. C. D. L.

Packard, Francis R. HARVEY and the tercentenary celebration of the Royal College of Physicians of London. *Annals of medical history*, 10, 498-503, 1928. ISIS

Rolleston, Sir Humphry. HARVEY's predecessors and contemporaries. *Annals of medical history*, 10, 323-37, 8 fig., 1928. ISIS

This valuable essay includes some of the immediately important developments resulting from HARVEY's work and discusses the claims of various anticipators of it. C. D. L.

Sigerist, Henry E. WILLIAM HARVEY's Stellung in der europäischen Geistesgeschichte. Sonderabdruck aus *Archiv für Kulturgeschichte*, 19, 158-68, Leipzig, 1928. ISIS

Teixeira de Mattos, E. De phrenesie van de oude jonkvrouw JEANNE DE SPINOSA, te Rijssel. Tijdsbeeld uit het begin der 17e eeuw, behandeling en beloop van periodiek terugkeerende dwang- en waangedachten met reactieve handelingen bij tusschentijds ongerept verstand en goed geheugen. *Bijdragen tot de geschiedenis der geneeskunde*, 8, 295-303, 1928. ISIS

E. — *Alia.*

Brandt, Frithiof. THOMAS HOBBES' mechanical conception of nature. London, HACHETTE, 1928. ISIS

Bunten, A. Chambers. Life of ALICE BARNHAM (1592-1650), wife of Sir FRANCIS BACON, Baron Verulam, Viscount St. Albans. Mostly from unpublished documents. 82 p. London, Oliphants, 1928. ISIS

Hobbes, Thomas. The elements of law : Natural and politic. Edited by FERDINAND TÖNNIES and containing selected extracts from unprinted Mss. of THOMAS HOBBES. Cambridge University Press, 1928. ISIS

XVIIth Century (second half).

A. — *Mathematics.*

Einstein, Albert. ISAAC NEWTON. Annual report of the Smithsonian Inst. for 1927, 201-7, Washington, 1928. Reprinted from the *Manchester Guardian* of March 19, 1927. ISIS

Feldhaus, F. M. Die Rechenmaschinen von Sir SAMUEL MORLAND (1662-1672). 8. Euklid-Feldhaus-Beilage zur « Maschinen-Buchhaltung, » Nr. 11, 29-32, 4 Abb., Nov. 1928. ISIS

Feldhaus, F. M. LEIBNIZ erfindet die Staffelwalzen und die Sprossenräder. 10. Euklid-Feldhaus-Beilage zur « Maschinen-Buchhaltung », 37-44, Januar, 1929. ISIS

Newton, Isaac (1642-1727). A memorial volume edited for the Mathematical Association by W. J. GREENSTREET. VII + 181 p., 9 pl. London, G. BELL, 1927. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 391-93, 1928.

Newton, Sir Isaac. A bicentenary evaluation of his work. A series of papers prepared under the auspices of The History of Science Society, in collaboration with The American Astronomical Society, The American Mathematical Society, The American Physical Society, The Mathematical Association of America and various other organizations. Edited by F. E. BRASCH. IX + 351 p., 3 pl. Baltimore, WILLIAMS and WILKINS, 1928 (five dollars). ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 387-93, 1928.

Picard, Emile. Un double centenaire, NEWTON et LAPLACE. Discours prononcé à la Sorbonne, le mercredi 4 mai 1927. 26 p. Paris, Palais de l'Institut, 1927 (reprinted in *Revue générale des Sciences*, 38,357-66, 1927). ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 393, 1928.

B. — *Physical Sciences and Technology.*

Browne, C. A. Scientific notes from the books and letters of JOHN

WINTHROP, jr., (1606-1676), first governor of Connecticut. *Isis*, 11, 325-42, 2 pl., 1928. ISIS

Snow, A. J. Matter and gravity in NEWTON's physical philosophy. A study in the natural philosophy of NEWTON's time. 256 p. London, Oxford University Press, 1926. ISIS

Reviewed by HEINRICH WIELEITNER, *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 213-15, 1928.

C. — *Natural Sciences.*

Adams, Frank Dawson. Rainfall and run-off. *Science*, vol. 67, 500-501, 1928. ISIS

The first demonstration that, in spite of ARISTOTLE's statement to the contrary, the rainfall is not only sufficient but more than sufficient to supply the rivers with all their water is contained in a little book which was published in Paris in 1674 under the title « De l'origine des fontaines. » This work of duo-decimo size and containing 353 pages appeared anonymously. ADAMS has found that the author of that discovery was PIERRE PERRAULT (1608-80). In 1686, the discovery was confirmed by EDME MARIOTTE. See another paper by same author classified under geology. G. S.

De Waard, C. De Zeeuwsche expeditie naar de west onder CORNELIS EVERTSEN den Jonge 1672-1674; Nieuw Nederland een jaar onder nederlandsch bestuur. (*Werken uitgegeven door de Linschoten-Vereeniging*, 30). LXIX + 237 p., front., 3 pl., 3 maps. 's Gravenhage, MARTINUS NIJHOFF, 1928. ISIS

Froger, François. Relation du premier voyage des François à la Chine fait en 1698, 1699 et 1700 sur le vaisseau L'Amphitrite. Edited by E. A. VORETZSCH. XVI + 187 p. Leipzig, Verlag der Asia Major, 1926. ISIS

Reviewed by PAUL PELLIOT. *Journal des Savants*, 433-451, etc. 1928.

Metzler, Johannes. NIELS STEENSEN, en stor Naturforsker og Laege. Kobenhavn, St. Ansgars Boghandel, 1928. VI + 82 p. 4 fig. ISIS

The author, formerly a Catholic priest in Copenhagen, has for years studied the life of NICOLAUS STENO (1631-87) and published valuable papers on him. (*Hist.-polit. Blätter für das kath. Deutschland*, Bd. 148, 1911. *Personalhistorisk Tidsskrift* VI R. II (1911). *Varden* 1911 n° 9). This book does not bring new facts about STENO as a man of science, but new light is thrown upon his conversion and his religious activity, because the author has been able to consult Catholic archives, which had been hitherto out of reach. An index and a very complete bibliography are added. J. W. S. J.

Scott, Flora Murray. The botany of MARCELLO MALPIGHI, Doctor of Medicine. *Scientific Monthly*, 25, 546, 1927. ISIS

A brief biographical sketch with translations of notes on MALPIGHI's (1628-1694) botanical contributions. C. D. L.

Sindik, I. Eine Karte CORONELLI's von der Bocche di Cattaro aus dem Jahre 1688. *Bulletin de la Société de Géographie de Beograd*, 13, 86-93, 1927. (In Serbian with a German summary.) ISIS

Description and halftone reproduction of one of the first accurate maps of the Bocche di Cattaro, which appeared in MARCO VINCENZO CORONELLI's (c. 1650-1718) Atlante Veneto. J. K. W.

Wood, S. MARTIN LISTER (1638-1712). Zoologist and physician. *Annals of Medical History*, 1, 87-104, 2 fig., 1929. ISIS

D. — *Medical Sciences.*

Frey, Hugo. Historische Notizen über DUVERNEY und seinen « Traité de l'Organe de l'Ouie ». Festschrift MAX NEUBURGER gewidmet, 105-14, Wien, 1928. ISIS

Apropos of JOSEPH GUICHARD DUVERNEY (1648-1730) : Traité de l'organe de l'ouie, Paris, 1683.

Haberling, Wilhelm. Erste Beschreibung und bildliche Darstellung eines Herzklappenfehlers. *Die Medizinische Welt*, Nr. 43, 6 S., 6 Abb., 1928. ISIS

The earliest description of valvular insufficiency (mitral stenosis) was given and illustrated by RAYMOND VIEUSSENS (1641-1716), physician in Montpellier, in his Traité nouveau de la structure et des causes du mouvement naturel du cœur (Toulouse, 1715). G. S.

Johnsson, J. W. S. (d. 1929) L'anatomie mandchoue et les figures de TH. BARTHOLIN, étude d'iconographie comparée. (*Det. Kgl. Danske Videnskabernes Selskab. Biologiske Meddelelser*, VII, 7.) 42 p. Kobenhavn, ANDR. FRED. HOST, 1928. ISIS

Analyse iconographique de l'Anatomie mandchoue dont une édition facsimile a été récemment publiée à Copenhague (1928; *Isis*, 12, 161). « Le tableau ci-dessus des planches et des sources des figures montre que c'est à juste titre que le nom de TH. BARTHOLIN est attaché à l'atlas chinois ; d'ailleurs 118 dessins sur 175 se rencontrent dans l'édition 1673 (1674) de l'Anatomie. Mais le modèle de toutes les figures chinoises n'a pas encore été déterminé. Il manque 20 ou plutôt 19, parcequ'un dessin se trouve en double. Pour 24 dessins nous savons que BARTHOLIN n'en a pas été la source; néanmoins E. INGERSLEV a raison de dire que la détermination des originaux des dessins chinois est intimement liée à l'iconographie Bartholinienne »...« Si l'on cherche à se rendre compte de l'époque à laquelle l'atlas fut dessiné, on a deux points de repère : 1698, l'année ou PARENNIN est venu en Chine, et 1722, l'année de la mort de l'empereur K'ANG-HI. Il n'est pas à présumer que le travail de la rédaction de l'Atlas ait été continué après la mort de l'empereur, qui en avait été l'initiateur et qui en avait suivi la préparation

et les progrès avec tant d'intérêt. Cependant il est impossible de déterminer avec précision la date; on sait seulement que le travail dura cinq années et que la période postérieure à 1700 ne présente rien d'original. Il semble donc que l'atlas ait été composé dans les toutes dernières années du XVII^e siècle et dans les premières années du XVIII^e siècle, peut-être de 1698 à 1703. » G. S.

Strömgren, Hedvig. Aus einer schwedischen Hausapotheke. Festschrift MAX NEUBURGER gewidmet, 281-86, Wien, 1928. ISIS

Apropos of CARL LINDH : Huus-Apoteek och Läkie-Book (Wisingsborg, 1675).

Temkin, Oswei. THOMAS SYDENHAM und der Naturbegriff des 17. Jahrhunderts. Festschrift MAX NEUBURGER gewidmet, 287-95, Wien, 1928. ISIS

E. — *Alia.*

Gunther, Robert Theodore. The architecture of Sir ROGER PRATT (1620-84). CHARLES II's commissioner for the rebuilding of London after the great fire : now printed for the first time from his note-books. 12 pl., 6 fig. Oxford, Printed by JOHN JOHNSON for the author at the University Press, 1928. ISIS

Landsdowne, Marquis of. The PETTY-SOUTHWELL correspondence, 1676-1687. Edited from the Bowood Papers. XXXII + 343 p. London, CONSTABLE, 1928. ISIS

Sir WILLIAM PETTY (1623-87), the « father of political economy » and Sir ROBERT SOUTHWELL (1635-1702), diplomatist, were relatives by marriage.

XVIIIth Century (whole and first half).

A. — *Mathematics.*

Alembert, Jean d'. Discours sur la philosophie prononcé par D'ALEMBERT le 3 décembre, 1768. Facsimile reproduction of the author's manuscript. 13 p. Privately printed for DAVID EUGENE SMITH. New York, Dec. 3, 1928. ISIS

Facsimile reproduction of D'ALEMBERT's manuscript of the paper which he read before the Academy of Sciences in the presence of the King of Denmark, in 1768. The manuscript is in Dr. SMITH's possession, but he is now sharing it with his friends by means of this beautiful facsimile. G. S.

B. — *Physical Sciences and Technology.*

Martin, Alfred. Der Salzmeister JOSEPH TODESCO und seine Familie.

Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik, 11, 111-22, 1928. ISIS

C. — *Natural Sciences.*

Donazzolo, Pietro. Mons. EUGENIO PILOTI e le condizioni della Cina nel 1735. *Bollettino della Reale Società Geografica Italiana*, 5, 305-340, 1928. ISIS

Notes on a series of manuscript letters of the missionary Mons. EUGENIO PILOTI (1699-1766). The text is given of an extract made by PILOTI from a Chinese publication entitled Zin-Xim (or Imperial Register) giving details regarding the contemporary administrative organization of the Chinese Empire by provinces and cities. J. K. W.

Réaumur, R. A. F. de. Histoire des fourmis. Avec notes de CHARLES PÉREZ. (*Encyclopédie entomologique*, vol. 11). 116 p. Paris, LECHEVALIER, 1928. ISIS

Robertson, W. E. Aitchison. Extraordinary delivery of rabbits. *Annals of medical history*, 10, 368-75, 1928. ISIS

« In the case about to be described we find several educated men, two hundred years ago, firmly convinced that a woman of Godalming, in Surrey, had given birth to eighteen rabbits. JOHN HOWARD, who attended the woman during the whole time, was a surgeon who had practiced midwifery at Guildford for more than thirty years and was accounted a man of known probity, character and capacity in his profession. »

Shelvocke, George (fl. 1690-1728). A voyage round the world. Introduction and notes by W. G. PERRIN. XXII + 262 p. London, CASSELL, 1928. ISIS

D. — *Medical Sciences.*

Caulfield, Ernest. A full view of all the diseases incident to children. Also recording an early case of infantile cerebral hemorrhage. The earliest pediatric anthology (1742). *Annals of medical history*, 10, 409-16, 1928. ISIS

Fritz, Joseph. Zu G. VAN SWIETENS Commentaren von BOERHAAVES Institutionen. Festschrift MAX NEUBURGER gewidmet, 115-19, 1 Abb., Wien, 1928. ISIS

Morgagni, Giovanni Battista (1682-1771). De Vita et Scriptis ANTONII MARIAE VALSALVAE Commentariolum JOAN. BAPT. MORGAGNI. 32 p. Patavii Typis Seminarii, 1923. ISIS

A reprint of an authoritative source for biographical material on VALSALVA

(1666-1723) edited by Prof. LUIGI SABBATANI of Padua on the occasion of the second centenary of the death of VALSALVA. The influence of the work of this Italian investigator does not seem to be sufficiently appreciated. He was the first to emphasize that the cerebral lesion in apoplexy is on the opposite side from the resulting paralysis and he performed important experiments in connection with certain respiratory and circulatory phenomena. C. D. L.

E. — *Alia.*

Charles-Roux, Fr. Les échelles de Syrie et de Palestine au XVIII^e siècle. 224 p., 27 pl. Paris, GEUTHNER, 1928. ISIS

XVIIIth Century (second half).

A. — *Mathematics.*

Barthel, Ernst. JOHANN HEINRICH LAMBERT. Ein Lebensbild zur zweihundertsten Wiederkehr seines Geburtstages am 26. August, 1928. *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 37-62, 1928. ISIS

B. — *Physical Sciences and Technology.*

Hall, Courtney R. A chemist of a century ago. *Journal of Chemical Education*, 5, 253-57, 1928. ISIS

SAMUEL LATHAM MITCHELL, 1764-1831, professor of « chemistry, natural history, agriculture and other arts depending thereon » at Columbia College, New York City, did much to help the diffusion of chemistry in the United States. Of especial service were his « Synopsis of Chemical Nomenclature and Arrangement », New York, 1801, and the Medical Repository, which during the first years of its publication was a medium for the statement of arguments for and against the phlogiston doctrine. This periodical was established by MITCHELL, ELIHU SMITH and EDWARD MILLER, and was the first medical journal in the United States, appearing 1797-1824.

T. L. D.

Laurent, Fernand. JEAN SYLVAIN BAILLY, premier maire de Paris (1736-93). VIII + 460 p., ill., BOIVIN, Paris, 1927. ISIS

Reviewed by L. GUINET, *Isis*, 11, 393-95, 1928.

Neugebauer, O. GEORG CHRISTOFF LICHTENBERG und die exakten Wissenschaften. Materialien zu seiner Biographie von P. HAHN. (Göttingen, 1927). *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 209-12, 1928. ISIS

Stenger, Erich. CARL v. DALBERGS Versuche mit Steatit. *Archiv für*

Geschichte der Mathematik, der Naturwissenschaften und der Technik, 11, 92-110, 6 Abb., 1928. ISIS

C. — *Natural Sciences.*

Amat y Juinent, Manuel de. Historia geographica é hidrographica con derrotero general correlativo al Plan de el Reyno de Chile (Ayala) que remite á Nuestro Monarca el Señor DON CARLOS III°, que Dios guarde, Rey de las Españas y de las Indias, su Gobernador y Capitan General Dn. MANUEL DE AMAT Y JUINENT. *Revista chilena de historia y geografia*, vol. 49, 297-344, 1924; vol. 50, 377-92, 1924; vol. 51, 425-58, 1925-26; vol 52, 360-401, 1927; vol. 53, 393-432, 1927; vol. 54, 407-22, 1927; vol. 55, 353-79, 1927; vol. 56, 394-426, 1928; vol. 57, 318-333, 1928; vol. 58, 305-337, 1928. ISIS

The Ms. published under the above title dates from 1760. J. K. W.

Banks, Sir Joseph (1743-1820). President of the Royal Society from 1778 until 1820. *Nature*, 122, 815-16, 1928. ISIS

Bolton, Herbert Eugene. Fray JUAN CRESPI, missionary explorer on the Pacific coast 1769-1774. LXVI + 402 p., front., 10 pl. maps. Berkeley, Calif., University of California Press, 1927. ISIS

CRESPI, Franciscan friar of Mallorca, « was put in charge of Mission Purísima Concepción » in Lower California in 1767. Two years later « with [GASPAR DE] PORTOLÁ he continued north, accomplishing the first European expedition by land up the California coast. Seeking the harbor of Monterey, he pushed still farther north, and became one of the discoverers of San Francisco Bay. » In 1772 « he went with [PEDRO] FAGES to find a way around San Francisco Bay to Point Reyes. Still another year later... he went as chaplain on the great sea voyage made by JUAN PÉREZ » as far north as Queen Charlotte Island. « Of all his expeditions he kept superb records, » translations of which are here reprinted from Professor BOLTON's English edition of FRANCISCO PALOU's New California (Berkeley, Cal., 1926) « with the addition of several important hitherto unpublished documents, a special introduction, and editorial notes. » J. K. W.

Farquhar, Francis P. Spanish discovery of the Sierra Nevada. Sierra Club Bulletin, 13, 54-61, 1928. ISIS

Although shown on a map drawn by Fray JUAN CRESPI, who visited the central valley of California in 1772, « the effective discovery of the Sierra Nevada rests... with the Franciscan missionaries, FRANCISCO GARCÉS and PEDRO FONT, 1775-1776. Further details were not learned until the expeditions of GABRIEL MORAGA in 1806 and of LUIS ARGUELLO in 1817, and only with « the coming of the American trappers at the beginning of the second quarter of the nineteenth century » can the exploration of the Sierras be said really to have begun. J. K. W.

Gabba, Luigi. La carta della Lombardia a cura degli astronomi di Brera. *L'Universo*, 9, 663-72, 1928. ISIS

Of this handsome and accurate map made in the last years of the eighteenth and early nineteenth centuries only two copies are known. Work upon it was discontinued in 1807 owing to disagreement between the French officials and the Brera astronomers. J. K. W.

Hermannsson, Halldór. Sir JOSEPH BANKS and Iceland. *Islandica*, vol. 18, 99 p., 27 pl. Ithaca, N. Y., Cornell University Library; London, MILFORD, 1928. ISIS

In 1772, soon after his return from COOK's first voyage, Sir JOSEPH BANKS (1743-1820) visited Iceland. In the course of the journey important scientific collections were made. BANKS' Ms. journal kept during the expedition was sold at auction in 1886 and has since disappeared. Mr. HERMANNSSON has gathered details from other sources regarding this expedition and BANKS' subsequent activities in behalf of the Icelanders. During the Napoleonic era when Great Britain was at war with Denmark, BANKS advocated the annexation of Iceland. Reproductions are given of an exceptionally striking series of drawings of Icelandic scenes made by one of BANKS' party. J. K. W.

Johnson, Walter. GILBERT WHITE: pioneer, poet, and stylist. XVI + 340 p., 4 pl. London, MURRAY, 1928. ISIS

Müller, Martin. FRIEDRICH CASIMIR MEDICUS (1736-1808). Beiträge zur Biologie in der zweiten Hälfte des 18. Jahrhunderts. *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 67-80, 1928. ISIS

Zimmermann, Heinrich. ZIMMERMANN's account of the third voyage of Captain COOK. 1776-1780. Translated by U. TEWSLEY. (*Alexander Turnbull Library Bulletin* nº 2.) 49 p., 2 pl., map, facsim. Wellington, W. A. G. SKINNER, 1926. ISIS

HEINRICH ZIMMERMANN was a common sailor on COOK's third voyage. His narrative was published at Mannheim, in 1781. J. K. W.

D. — *Medical Sciences.*

Bologa, Valeriu L. JOHANN MOLNÁR von Müllersheim, recte JOAN PINARIU (1741-1815). Ein Beitrag zur Geschichte der ersten Wiener Schule und ihrer Ausstrahlungen. Festschrift MAX NEUBURGER gewidmet, 47-53, Wien, 1928. ISIS

Delaunay, Paul. Un médecin maire de Chartres sous la Révolution, RENÉ-FRANÇOIS JUDEL. *Bull. de la société française d'histoire de a médecine*, 22, 233-54, illus., 1928. ISIS

Gins, Heinrich A. Aus der Zeit der Einführung des Jennerschen Schutzimpfungsverfahrens in Preussen. *Archiv für Geschichte der Mathematiek, der Naturwissenschaften und der Technik*, 11, 80-7, 2 Abb., 1928. ISIS

Grunth, P. Om PETER CHRISTIAN ABILDGAARDS Forhold til Beslagkunsten. Festskrift til BERNHARD BANG, 1928. Many illustrations, portraits and facsimiles. ISIS

ABILDGAARD (22/12. 1740—21/1. 1801) founded the veterinary high-school at Copenhagen, 1770. He was the first to give the right principles for the construction of horseshoes. J. W. S. J.

Heberden, William. An introduction to the study of physics. Edited by LE ROY CRUMMER. *Annals of medical history*, 10, 349-67, 1928. ISIS

Herrick, James B. WILLIAM HEBERDEN. *Bulletin of the Society of Medical History of Chicago*, 4, 30, April, 1928. ISIS

Hult, Olof. Om ROLAND MARTIN och hans studieresa till Paris 1754-1756. *Svenska Linne Sällskapets Årsskrift*, 11, 6 figs., 1928. ISIS

Extracts from a diary kept in 1754-56, when ROLAND MARTIN of the RUDBECK family was studying abroad, before he was named professor of anatomy at Upsala. Very interesting statements about a student's life in Paris at that time. A summary of this paper will appear in the reports of the international congress of medical history, Holland, 1927. J. W. S. J.

Johnsson, J. W. S. (d. 1929) and **Krekich, A.** La peste de 1763 en Dalmatie. G. C. P. CICAVO : Relazione della peste insorta l'anno 1763 nei Borghi di Spalato con il Progetto dell'Autore per diffendere la Dalmazia dai successivi Attachi del Morbo contagioso. Ms. de la Bibliothèque Royale de Copenhague. *Isis*, 11, 343-363, 1 pl., 1928. ISIS

Introductory essay.

Marzell, Heinrich. Volksmedizinischer Aberglaube aus Franken am Ausgang des 18. Jahrhunderts. *Archiv für Geschichte der Medizin*, 22, 87-101, 1929. ISIS

Middleton, William S. The yellow fever epidemic of 1793 in Philadeplhia. *Annals of medical history*, 10, 434-50, 3 fig., 1928. ISIS

Robinson, Victor. EDWARD JENNER. *Medical life*, 35, 597-618, 1928. ISIS

Thoms, Herbert. ALBIGENCE WALDO, surgeon. His diary written at Valley Forge. *Annals of medical history*, 10, 486-97, 1928. ISIS

Thomson, Sir St. Clair. The strenuous life of a physician in the 18th century. *Annals of Medical History*, 11, 1-13, 8 figs., 1929. ISIS

Apropos of JOHN COAKLEY LETTSOM (1744-1815), founder of the Medical Society, London, 1773.

Tischner, Rudolf. FRANZ ANTON MESMER. Leben, Werk und Wirkungen. 9 Abbildungen. Münchner Drucke, 1928. ISIS

Reviewed by F. M. G. DE FEYFER, *Bijdragen tot de geschiedenis der geneeskunde*, 8, 188-189, 1928.

Woolf, A. E. Mortimer. Some personalities of the Hunterian epoch. *Annals of Medical History*, 11, 105-115, 1929. ISIS

E. — *Alia.*

Clark, John Maurice; Douglas, Paul H.; Hollander, Jacob H.; Morrow, Glenn R.; Palyi, Melchior; Viner, Jacob. ADAM SMITH, 1776-1926. Lectures to commemorate the sesquicentennial of the publication of « The Wealth of Nations. » IX + 241 p. Chicago, University Press, 1928. ISIS

Eden, Sir Frederic Morton (1766-1809). The state of the poor : a history of the labouring classes in England, with parochial reports. Abridged and edited by A. G. L. ROGERS. With an introduction. LI + 383 p. London, ROUTLEDGE, 1928. ISIS

Ischer, Anna. ALBRECHT VON HALLER und das klassische Altertum. (Sprache und Dichtung.) 272 p. Bern, PAUL HAUPT, 1928. ISIS

Reviewed by RICHARD ALEWYN, *Deutsche Literaturzeitung*, 5, 2060-61, 1928.

Marcus, Ernst. Die Zeit- und Raumlehre KANTS. (Transzendentale Ästhetik.) In Anwendung auf Mathematik und Naturwissenschaft. VIII + 240 S. München, REINHARDT, 1927. ISIS

XIXth Century (whole and first half).

A. — *Mathematics.*

Coolidge, Julian L. The heroic age of geometry. *Bulletin of the American Mathematical Society*, 35, 1-19, 1929. ISIS

Meder, Alfred. Direkte und indirekte Beziehungen zwischen GAUSS

und der Dorpater Universität. *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 62-7, 1928. ISIS

Struik, Ruth and **D. J.** CAUCHY and BOLZANO in Prague. *Isis*, 11, 364-66, 1928. ISIS

B. — *Physical Sciences and Technology.*

Antoniadi, E. M. The centenary of AUGUSTIN FRESNEL. Translated from *l'Astronomie*, Paris, June 1927. *Annual report of the Smithsonian Inst.* for 1927, 217-20, 1 pl., Washington, 1928. ISIS

Browne, Charles Albert. EMERSON and chemistry. 22 p. *Journal of Chemical Education* for March and April, 1928. ISIS

Hulme, E. Wyndham; Bone, William A. The invention of the hot blast in iron-smelting. *Nature*, 122, 728, 1928. ISIS

Kordes, H. Einiges über Agrikulturchemie im 19. Jahrhundert. *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 87-92, 1928. ISIS

Leffmann, Henry. The invention of the dynamo. *Science*, 68, 1928. ISIS

Lippmann, Edmund O. von. Vor hundert Jahren (VIII). 3 p. *Die Deutsche Zuckerindustrie*, Nr. 1, Berlin, 1929. ISIS

Zu Beginn des Jahres 1829 erschien zu Amsterdam eine Schrift der Utrechter Professoren C. M. VAN DYK und A. VAN BEEK, betitelt 'Oonderzoekingen aangande het Zwart in de Melisbroden'; diese 'Untersuchungen über die Schwarzfärbung der Melisbrode' (2 Abteilungen mit 4 Tafeln) betreffen eine schwere Störung des Raffinerie-Betriebes, die 'durch Verderben der schon fast fertigen Waare, bei der eine Abhilfe nicht mehr möglich ist', den Fabrikanten ganz ausserordentliche Verluste verursachte. Sie sind mit so staunenswerter Kenntnis, so gründlich und erschöpfend ausgeführt, dass sie nicht nur mit Rücksicht auf die damalige Zeit, sondern auch heutigen Tages als mustergültig gelten dürfen, und als eine der ersten erfolgreichen Anwendungen wissenschaftlicher Forschung auf die Praxis der Industrie einen Ehrenplatz in deren Geschichte verdienen.»

Meeker, George H. FRIEDRICH WÖHLER and a biologic milestone. *Medical life*, 35, 571-75, 1928. ISIS

Neumann, Franz. Gesammelte Werke. Hrsg. von seinen Schülern. Bd. I. 428 p. Leipzig, TEUBNER, 1928. ISIS

Reviewed by A. JOHNSEN, *Deutsche Literaturzeitung*, 5, 2519-2521, 1928.

Smith, Edgar F. Some experiences of Dr. EDGAR F. SMITH as a student under WÖHLER. *Journal of Chemical Education*, 5, 1554-1557, 1928. ISIS

Report of the reminiscences related by Dr. SMITH to a small group of chemists one evening during the meeting of the American Chemical Society at St. Louis, April, 1928. T. L. D.

Walden, Paul. Die Bedeutung der Wöhlerschen Harnstoff-Synthese. (Ein Jahrhundert der chemischen Synthese.) Nach einem Vortrag in der 1. Allgemeinen Sitzung der 90. Vers. deutsch. Naturf. und Aerzte in Hamburg, 1928. *Z. für angew. Chemie*, 41, p. 1096, 1928. ISIS

Warren, W. H. The contemporary reception of WÖHLER's Discovery of the synthesis of urea. *Journal of Chemical Education*, 5, 1539-1553, 1928. ISIS

The actual production of urea by artificial means occurred, but was not recognized as such, in 1824 when WÖHLER, working in the laboratory of BERZELIUS, studied the interaction of cyanogen and ammonia water, and identified ammonium oxalate and ammonium cyanide among the products and isolated another white crystalline substance « which however was not ammonium cyanate ». In 1828 he announced that this white crystalline substance was identical with urea from urine. T. L. D.

C. — *Natural Sciences.*

Caskie, Jaquelin Ambler. Life and letters of MATTHEW FONTAINE MAURY (1806-73). 191 p., front., pl. Richmond, Va., Richmond Press, 1928. ISIS

Not seen. For another biography of MAURY, by CHARLES LEE LEWIS (Annapolis, Md., 1927) see *Isis*, 11, 470. G. S.

Haberling, Wilhelm. ALEXANDER VON HUMBOLDT and JOHANNES MÜLLER. With hitherto unpublished letters of HUMBOLDT. *Medical life*, 35, 529-36, illus., 1928. ISIS

Huber, François (1750-1831). New observations on bees. Translated from the French by C. P. DADANT. 230 p., illus. Hamilton, Illinois, *American Bee Journal*, 1926. ISIS

Huc, Evariste Régis and **Gabet, Joseph.** Travels in Tartary, Thibet and China, 1844-1846. Translated by WILLIAM HAZLITT. Edited with an introduction by PAUL PELLIOT. In two volumes, vol. I. XLIV + 387 p. Vol. II. VIII + 406 p. (The Broadway Travellers). London, KEGAN PAUL, 1928. ISIS

O'Connor, Francisco Burdett. Reconocimiento del litoral de Atacama en 1826. *Revista Chilena de Historia y Geografia*, 58, 267-285, 1928. ISIS

A hitherto unpublished geographical account of the region which forms the present province of Antofagasta, Chile, by the Bolivian general staff officer Col. FRANCISCO BURDETT O'CONNOR. J. K. W.

Pompeckj, Josef Felix. J. C. M. REINECKE, ein deutscher Vorkämpfer der Deszendenzlehre aus dem Anfange des 19. Jahrhunderts. *Paläontol. Zeitschr.*, 8, 39-42, 1927. ISIS

Radojcić, Nikola. Das geographische Wissen über Serbien am Anfang des 19. Jahrhunderts. (In Serbian with a German summary.) (*Editions spéciales de la Société de Géographie de Belgrade*, vol. 2, nº 2.) VII + 100 p., map. Belgrade, 1927. ISIS

Until well into the nineteenth century Serbia, from the geographical point of view, was one of the least known parts of Europe. The present monograph has to do particularly with a map and description of Serbia first published by the Austrian army officer ADAM WEINGARTEN (1788-1831) in the *Österreichische militärische Zeitschrift* in 1820. The German text and the map are here reprinted. WEINGARTEN's work remained authoritative until superseded by the scientific geographical studies of AMI BOUÉ (1836-1838), G. J. HAHN (1834), and F. KANITZ (1859-1861). J. K. W.

Sammarco, Angelo. L'importanza del Giornale di Viaggio de G. B. BROCCHI per la conoscenza dell'Egitto e del Sudan. *Bulletin de la Société Royale de Géographie d'Egypte*, 16, 189-223, 1928. ISIS

The Giornale delle osservazioni fatte nei viaggi in Egitto, nella Siria e nella Nubia (Bassano, 1841-1843) was published about twenty years after the death of its author, the gifted Italian naturalist, GIAMBATTISTA BROCCHI (1772-1826) who carried out extended explorations at the behest of MEHEMET ALI. Although generally overlooked by later scholars, BROCCHI's five volumes contain a wealth of valuable though unsystematically arranged information relating particularly to the geology, geography, ethnography, and history of Egypt, Nubia, and Sennar. J. K. W.

Studnička, F. K. JOH. EV. PURKINJES und seiner Schule Verdienste um die Entdeckung tierischer Zellen und um die Aufstellung der « Zellen »-Theorie. *Acta societatis scientiarum naturalium moravicae*, tomus 4, p. 98-168, 1 pl., Brno, 1927. ISIS

« Mit der 1839 veröffentlichten Schrift von THEODOR SCHWANN über die 'Übereinstimmung in der Struktur und dem Wachsthum der Thiere und Pflanzen' beginnt, wie wir wissen, eine neue Ära in der Geschichte der tierischen Histologie, doch der Verfasser jenes Werkes war nicht zugleich der Entdecker der tierischen Zellen, wie man so oft meint, man kannte solche schon früher, auch unter anderen Namen, sogar aus vielen Geweben. Auch der Gedanke der Übereinstimmung in der Struktur der Pflanzen und der

Tiere wurde, wenn auch in einer etwas anderen Form, schon früher ausgesprochen. SCHWANN hat, so können wir gleich jetzt sagen, das Verdienst, die Reihe der Tatsachen, welche bereits früher bekannt waren, ergänzt zu haben, und er hat, auf seine eigenen, gewiss sehr umfangreichen Beobachtungen sich stützend, den Gedanken von der 'Übereinstimmung' näher begründet und zu einer gut abgerundeten, jedoch, wie wir es heute sagen müssen, nicht in jeder Beziehung richtigen Lehre verarbeitet. Es gelang ihm seine Lehre der damaligen wissenschaftlichen Welt in einer solchen Form vorzulegen, dass sie sogleich überall günstige Annahme fand, binnen der kürzesten Zeit über alle anderen Lehren siegte, und eine feste Grundlage für die Weiterentwicklung der Histologie bildete.» « WOLFF, OKEN, DUTROCHET und schliesslich auch SCHWANN liessen sich durch den Gedanken einer prinzipiellen 'Übereinstimmung' verleiten; sie suchten bei den tierischen Geweben dieselben Elementarbestandteile, die ihnen von den Pflanzen bekannt waren, die Bläschen oder 'Zellen'; sie fanden solche in einigen Geweben, und sie dachten gleich, dass solche im Tierkörper überall vorhanden sein müssen. Das war ein Irrtum; die Bläschen sind im Tierkörper nicht überall vorhanden, in sehr zahlreichen Fällen gibt es da kompakte Körnchen die hier PURKINJE ganz richtig, als der erste, beobachtet hat. Zuerst, ehe man den Inhalt der Pflanzenzellen kannte, hat man ihre Bedeutung nicht gut verstanden, später fand man das Protoplasma und es zeigte sich, dass der Purkinjesche Gedanke vollkommen richtig war. Diejenigen, die in allen Tierzellen das Vorhandensein von mit unseren Mitteln schwer nachweisbaren histologischen Zellmembranen annehmen wollten, mussten schliesslich verstummen und wir bauen seit der Zeit auf einer Grundlage, die schon PURKINJE bekannt war.»

Studnička, F. K. JOH. EV. PURKINJES und seiner Schule Verdienste um die Entdeckung der tierischen Zellen und um die Aufstellung der Zellentheorie. *Vorläufige Mitteilung. Anatomischer Anzeiger*, 64, 140-44, Jena, 1927. ISIS

Summary of the memoir bearing the same title published in Brünn, 1927. « Die grössten Verdienste um die Entdeckung der 'Zellen' in den verschiedensten tierischen Geweben haben sich vor dem Jahre 1839 zwei Schulen in Deutschland erworben: die Schule von J. E. PURKINJE in Breslau und die Schule von JOHANNES MÜLLER in Berlin. Zu der letzteren gehörte bekanntlich auch THEODOR SCHWANN. Ausserhalb dieser Schulen sind nur wenige Entdeckungen, die uns hier interessieren könnten, entstanden». G. S.

Van Roon, J. De officieele kartografie van Nederland in de jaren 1798-1864. *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, 45, 383-411, 1928. ISIS

D. — *Medical Sciences.*

Berghoff, Emanuel. CARABELLI, der erste Wiener Zahnarzt. Festschrift MAX NEUBURGER gewidmet, 41-43, Wien, 1928. ISIS

GEORG CARABELLI of Lunkaszprie, born at Pest, 1787, died in Vienna, 1842. G. S.

Bishop, Louis Faugères, jr. Brief sketch of VALENTINE MOTT (1785-1865). *Medical life*, 35, 577-82, illus., 1928. ISIS

Bragman, Louis J. The medical wisdom of DE QUINCEY. *Annals of medical history*, 10, 451-59, 1928. ISIS

Chance, Burton. SQUIER LITTELL, M. D. (1803-86). A founder of American ophthalmology. *Annals of Medical History*, 1, 50-56, 4 fig., 1929. ISIS

Combes, Marguerite. Pauvre et aventureuse bourgeoisie, ROULIN et ses amis, 1796-1874. Paris, PEYRONNET, 1928. ISIS

Farley, David L. NATHANIEL CHAPMAN and his lectures on the practice of physic, Philadelphia, 1818. *Annals of medical history*, 10, 480-85, 4 fig., 1928. ISIS

Fosseyeux, Marcel. Paris médical en 1830. *Bull. de la société française d'histoire de la médecine*, 22, 255-306, illus., 1928. ISIS

Johnsson, J. W. S. Die erste Spezialisten-Gesellschaft Dänemarks. Festschrift MAX NEUBURGER gewidmet, 203-8, Wien, 1928. ISIS

Lovett, Beatrice R. PIERRE-FEDELE BRETONNEAU. *Bulletin of the Society of Medical History of Chicago*, 4, p. 54, April, 1928. ISIS

A well illustrated survey of the life and influence of BRETONNEAU (1778-1862). His chief influence was as a clinical teacher and his interests were chiefly in the specificity of diseases. C. D. L.

Maresch, Rudolf. Wie JOSEF HYRTL Chirurg werden sollte. Festschrift MAX NEUBURGER gewidmet, 231-48, Wien, 1928. ISIS

Robinson, Victor. JAMES YOUNG SIMPSON (1811-70). *Medical life*, 57-86, illus., 1929. ISIS

Rössle, R. Die pathologische Anatomie des JOHANNES MÜLLER. Nach einem aufgefundenen Kollegheft aus dem Jahre 1834. *Archiv für Geschichte der Medizin*, 22, 24-47, 1929. ISIS

Silva Carvalho, Augusto da. Cartas de VICENTE JOSÉ DE CARVALHO a ANTONIO PEDRO CARDOSO. *Arquivo de Anatomia e Antropologia*, 12, 5-43, Lisboa, 1928. ISIS

With portrait of VICENTE JOSÉ DE CARVALHO.

Sternberg, Maximilian. Ergänzungen zur Biographie SKODA's. Festschrift MAX NEUBURGER gewidmet, 278-80, Wien, 1928. ISIS

E. — *Alia.*

Style, Jane M. AUGUSTE COMTE, thinker and lover. v + 256 p., 1 pl. London, KEGAN PAUL, 1928. ISIS

Tiberghien, Albert. ADOLPHE QUETELET et l'enseignement. Extrait de la *Revue de l'Université de Bruxelles*, nº 3, 22 p., 1926. ISIS

« LAMBERT-ADOLPHE-JACQUES QUETELET a enseigné, pendant plus d'un demi-siècle, à Audenarde, à Gand, enfin à Bruxelles. Nous voudrions rappeler ici, brièvement, quelle fut la carrière du professeur, quelles furent ses idées sur l'enseignement supérieur, quelle influence il a exercée. »

XIXth Century (second half).

B. — *Physical Sciences and Technology.*

Adams, Edward Dean. Niagara power : history of the Niagara Falls Power Company, 1886-1918; evolution of its central power station and alternating current system. (Privately printed for the Niagara Power Falls Company on the fiftieth anniversary of its foundation, 1927.) In 2 volumes. Vol. 1 : History and power projects. XXII + 455 p. Vol. 2 : Construction and operation. XV + 504 p. Niagara Falls, N. Y., Niagara Falls Power Co., 1927. ISIS

Reviewed by A. R., *Nature*, 122, 916-17, 1928.

Blokh, Maks Abramovich. The life and work of VAN 'T HOFF. Petrograd, 1923. Published by the Nauchnoe Khimiko-Tekhnicheskoe izdatel'stvo (Scientific chemical technical publishers). At head of title : R. S. F. S. R. The Scientific-technical Department of (V. S. N. KH.) the Supreme Council of National Economy, 188 p., in Russian, portrait, Petrograd, 1923. ISIS

Brackett, R. N. THOMAS GREEN CLEMSON, LL. D., the chemist. (1807-1888). *Journal of Chemical Education*, 5, 433-444, 576-585, 1928. ISIS

Browne, C. A. EDGAR FAHS SMITH. Reprinted from *Journal of Chemical Education*, 5, 8 p., illus., June 1928. ISIS

Dunnington, F. P. A sketch of Dr. JOHN WILLIAM MALLET, as a chemist and a teacher (1832-1912). *Journal of Chemical Education*, 5, 183-188, 1928. ISIS

Gibbs, J. Willard. The collected works of J. WILLARD GIBBS. In 2 volumes. Vol. 1 : Thermodynamics. XXVIII + 434 p. Vol. 2 :

Part I. Elementary principles in statistical mechanics; part II. Dynamics, vector analysis and multiple algebra, electro-magnetic theory of light, etc. XVIII + 207; VI + 284 p. New York, LONGMANS, 1928. ISIS

Holzknecht, G. Abriss der historischen Entwicklung der wissenschaftlichen Anwendung der Röntgenstrahlen. Festschrift MAX NEUBURGER gewidmet, 183-87, Wien, 1928. ISIS

Lockyer, T. Mary; Lockyer, Winifred L. Life and work of Sir NORMAN LOCKYER. With the assistance of H. DINGLE, and contributions by CHARLES E. ST. JOHN, MEGH NAD SAHA, Sir NAPIER SHAW, H. N. RUSSELL, Rev. J. GRIFFITH, Sir RICHARD GREGORY, and A. FOWLER. XII + 474 p.; 17 pl. London, MACMILLAN, 1928. ISIS

Reviewed by HENRY E. ARMSTRONG, *Nature*, 122, 870-74, 1928.

McHargue, J. S. Dr. ROBERT PETER (1805-1894). *Journal of Chemical Education*, 5, 151-156, 1928. ISIS

Sampey, John R. J. LAWRENCE SMITH. *Journal of Chemical Education*, 5, 123-28, 1928. ISIS

J. LAWRENCE SMITH (1818-1893) devised many important methods of mineral analysis. T. L. D.

Travers, Morris W. The discovery of the rare gases. VII + 128 p. London, ARNOLD, 1928. ISIS

Reviewed by IRVINE MASSON, *Nature*, 123, 195-97, 1929.

C. — *Natural Sciences.*

Balta, José. La labor de RAIMONDI. 87 p. Lima, Imprenta TORRES AGUIRRE, 1926. ISIS

Biography and bibliography of the naturalist, geographer, geologist ANTONIO RAIMONDI. Born in Milan, 1826, emigrated to Lima in 1850, married a Peruvian lady in 1869, and spent the whole of his life in Peru, where he died, at San Pedro (Pacasmayo), in 1890. His activity was considerable, witness not only the books, papers, and maps published by him, but also abundant collections of all sorts of natural objects, and many manuscripts. He was one of the founders of Peruvian science. Our only regret is that no portrait was added to this elaborate biography. G. S.

Bateson, William. Letters from the steppe : written in the years 1886-1887. Edited, with an introduction, by BEATRICE BATESON. XVI + 222 p. London, METHUEN, 1928. ISIS

Bateson, William. Scientific papers. Edited by R. C. PUNNETT. In 2 volumes. Vol. 1. VIII + 452 p., 7 pl. Vol. 2. VIII + 503 p., 29 pl. Cambridge, University Press, 1928. ISIS

Bushnell, David I., jr. FRIEDRICH KURZ (1818-71), artist-explorer. *Annual report of the Smithsonian Inst. for* 1927, 507-27, 8 pl., 6 fig., Washington, 1928. ISIS

Coupland, Reginald. (Sir JOHN) KIRK on the Zambesi. A chapter of African history. VIII + 286 p., Oxford, Clarendon Press, 1928. ISIS

Dorsey, George A. The evolution of CHARLES DARWIN. XI + 300 p. London, ALLEN and UNWIN, 1928. ISIS

Du Bois-Reymond, Emil (1818-1896). Jugendbriefe von EMIL DU BOIS-REYMOND an EDUARD HALLMANN. Zu seinem hundertsten Geburtstag dem 7. November, 1918. Herausgegeben von ESTELLE DU BOIS-REYMOND. 155 p. Berlin, D. REIMER, 1918. ISIS

« Die nachfolgenden Briefe hat mein Vater als Student an seinen Freund, EDUARD HALLMANN, gerichtet. Sie stammen aus den Jahren 1839 bis 1850, beginnen also mit seinem 21. Lebensjahr, als er bereits einige Semester in Berlin und Bonn allgemeine Studien getrieben hatte und im Begriff stand, sich entschieden den Naturwissenschaften zuzuwenden. Auf diesen Weg war er hauptsächlich gewiesen worden durch den Umgang mit EDUARD HALLMANN (1813-55) der fünf Jahre älter war als er und einen ähnlichen Entwicklungsgang durchgemacht hatte. 'Ich war,' schreibt mein Vater selbst über sein Verhältnis zu HALLMANN, 'bei mathematischen Studien angelangt, die mir leblos blieben, weil sie an sich kein meinen eigentümlichen Kräften zusagender Stoff waren, der formalen Bildung aber, die sie mir gewährten, noch kein genügender Inhalt entsprach. Kein Wunder, dass in dieser peinlich zerrissenen Lage HALLMANNS reife und sichere Persönlichkeit sich leicht meiner bemächtigte. Wie überhaupt am Verkehr mit Menschen, hatte er an dieser Art didaktischen Umganges eine besondere Freude, und zeigte darin so viel Geduld und Eifer wie psychologischen Scharfblick. An seiner Hand wurde ich in das Gebiet der organischen Naturwissenschaft eingeführt. Unverzüglich erteilte er mir selber den ersten Unterricht in der Osteologie, und auf Streifzügen in der Umgegend Berlins, deren Armseligkeit ein poetisch jugendlicher Sinn verklärte, in der Botanik. Wenn es mir seitdem vergönnt gewesen ist, in der Physiologie etwas Erspriessliches zu leisten, so gebührt das Verdienst davon zunächst ihm. »

Merriam, C. Hart. WILLIAM HEALEY DALL (1845-1927). Reprinted from *Science*, Apr. 8, 1927. *Annual report of the Smithsonian Inst. for* 1927, 563-66, pl., Washington, 1928. ISIS

Nägeli, Carl. Die Micellartheorie. Auszüge aus den grundlegenden

Originalarbeiten NÄGELIS, Zusammenstellung und kurze Geschichte der Micellartheorie. Hrsg. von ALB. FREY. 143 p., pl. Leipzig, Ak. Verl.-Ges., 1928. ISIS

Smith, George Otis. CHARLES DOOLITTLE WALCOTT (1850-1927). Reprinted with different illustrations and some additions from the *American Journal of Science*, vol. 14, July, 1927. *Annual report of the Smithsonian Inst. for* 1927, 555-61, 2 pl., Washington, 1928. ISIS

Ward, Henshaw. CHARLES DARWIN: the man and his warfare. VIII + 472 p., 27 pl. London, MURRAY, 1928. ISIS

D. — *Medical Sciences.*

Holt, William Leland. JOSIAH CLARK NOTT of Mobile (1804-73). An American prophet of scientific medicine. Based on the researches of the late BAYARD HOLMES. *Medical life*, 35, 487-504, 1928. ISIS

Hume, Edgar Erskine. MAX VON PETTENKOFER. His theory of the etiology of cholera, typhoid fever and other intestinal diseases. A review of his arguments and evidence. 8 pl. New York, HOEBER, 1927. ISIS

Reviewed by THOMAS MCCRAE, *Annals of Medical History*, 1, 122, 1929.

Jackson, John Hughlings (1834-1911). Die Croonian-Vorlesungen über Aufbau und Abbau des Nervensystems. (Croonian Lectures on the evolution and dissolution of the nervous system) 1884, übersetzt und eingeleitet von OTTO SITTIG. Mit einem Vorwort von OTTO PÖTZL. 137 p. Berlin, S. KARGER, 1927. ISIS

Lyman, George D. The sponge. Its effect on the martyrdom of JAMES KING of William. The formation of the San Francisco vigilance committee of 1856, the execution of CASEY and CORA for murder and the trial of EDWARD MCGOWAN for complicity. *Annals of medical history*, 10, 460-79, 17 fig., 1928.

Robinson, Victor. TRUDEAU and tuberculosis. Festschrift MAX NEUBURGER gewidmet, 269-72, Wien, 1928. ISIS

EDWARD LIVINGSTONE TRUDEAU (1848-1915), of Saranac Lake, N. Y., about whom see *Isis*, 7, 240, 243.

Zeiss, Heinz. Eine Nachlese zum Leben und Sterben OTTO OBERMEIERS. Festschrift MAX NEUBURGER gewidmet, 323-29, Wien, 1928. ISIS

E. — *Alia.*

Lappo-Danilevskii, Aleksandr Sergievich (1863-1919). Materials for his biography, published by the Academy of Sciences (in Russian). 58 p. Leningrad, 1929. ISIS

Biography, bibliography and portrait. G. S.

Wilamowitz-Moellendorff, Ulrich von. Erinnerungen 1848-1914. 324 p., 2 fig., Leipzig, KOEHLER, 1928. ISIS

Reviewed by EDUARD MEYER, *Deutsche Literaturzeitung*, 5, 2489-94, 1928.

XXth Century.

B. — *Physical Sciences and Technology.*

Abbot, Charles G. The relations between the Smithsonian Institution and the WRIGHT brothers. (*Smithsonian miscellaneous collections*, volume 81, number 5). 27 p. City of Washington, Smithsonian Institution, 1928. ISIS

« This statement represents an attempt on the part of the Smithsonian Institution to clarify an unfortunate controversy, and to correct errors where errors have been made, in order to do justice alike to three great pioneers of human flight — WILBUR and ORVILLE WRIGHT, and SAMUEL PIERPONT LANGLEY, — as well as to the Smithsonian Institution. »

Bragg, Sir **William Henry**, and **Bragg, William Lawrence.** Die Reflexion von Röntgenstrahlen an Kristallen : Grundlegende Untersuchungen in den Jahren 1913 und 1914. XXVI + 148 p. Leipzig, Voss, 1928. ISIS

Pfeiffer, Paul. ALFRED WERNER (1866-1919). *Journal of Chemical Education*, 5, 1090-1098, 1928. ISIS

D. — *Medical Sciences.*

Freud, Sigmund. The problem of lay-analyses : and an autobiographical study. London, BRENTANO, 1928. ISIS

Körber, Heinrich. Gedenkrede, gehalten in der « Aerztlichen Gesellschaft für Sexualwissenschaft und Konstitutionsforschung zu Berlin » am 21. Oktober, 1927, von OTTO ADLER. *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 1 Abb., 218-23, 1928. ISIS

PART II.

HISTORICAL CLASSIFICATION.

Including only the items which could not be included in Part I — the fundamental (centurial) classification. Hence a student of Muslim science, for example, should not peruse simply the notes collected below under the heading « Islam », he should examine as well those included above under the headings VIIth century, VIIIth century, etc.

CONTENTS :

I. — *Antiquity* : 1. Antiquity (generalities); 2. Egypt; 3. Babylonia and Assyria; 4. Greece; 5. Rome.

II. — *Middle Ages* : 6. Middle Ages (generalities); 7. Byzantium.

III. — *Oriental Science and Civilization* : 8. Asia (generalities; Western Asia; Central Asia; Eastern Asia); 9. India; 10. China; 11. Japan; 12. Israel; 13. Iran; 14. Islam.

I. ANTIQUITY.

1. — ANTIQUITY (*gereralities*).

Atlantisfrage, zur *Petermanns Mitteilungen*, 73-74, 1927-1928. ISIS

I. ARTHUR BERGER : Elefanten auf Atlantis, 73, p. 143, 1927; II. THEODOR DOMBART : Die Grössenausdehnung von Atlantis, 143-144; III. ÉMILE-FÉLIX GAUTIER : Französische Forschungen zur Atlantisfrage, 144-45; IV. ALBERT HERRMANN : Atlantis und Tartessos, 145-49; V. FRITZ NETOLITZKY : PLATOS Insel Atlantis, 149-150; PAUL BORCHARDT : Erwiderung, 150-152; VI. PAUL BORCHARDT : Nord-Afrika und die Metallreichtümer von Atlantis, 280-282; VII. RICHARD HENNIG : Zur neuen BORCHARDT-HERRMANNSCHEN Atlantis- und Tartessoshypothese, 282-284; VIII. MEINULF KÜSTERS : Libysche Wortstämme in « atlantischen » Namen, 284; IX. ADOLF SCHULTEN : Tartessos und Atlantis, 284-288; X. ALBERT HERRMANN : Atlantis, Tartessos und die Säulen des Herakles, 288-93; XI. PAUL BORCHARDT : Nord-Afrika und die natürlichen Reichtümer von Atlantis, 326-328; XII. PAUL BORCHARDT : Die Messingstadt in 1001 Nacht — eine Erinnerung an Atlantis ?, 328-331; XIII. ALBERT HERRMANN : Atlantis und Troja, Völker und Städte Libyens und ihre irrtümliche Deutung durch die Griechen, 332-343; XIV. PAUL BORCHARDT : Zweite Erwiderung, 74, 35-36, 1928. J. K. W.

Bernhard, O. Über Malariabekämpfung im klassischen Altertum. Zwei Erinnerungsmünzen an die Sanierung von Selinunt durch

EMPEDOKLES. Festschrift MAX NEUBURGER gewidmet, 44-46, ill., Wien, 1928. ISIS

Berthelot, André. L'Afrique saharienne et soudanaise, ce qu'en ont connu les anciens. (Bibliothèque documentaire.) 431 p., 4 maps. Paris, Les Arts et le Livre, 1927. ISIS

Elaborate study of the texts of the ancient geographers and historians in the light of the results of modern explorations in the Sudan and Sahara. J. K. W.

Borchardt, Paul. Neue Beiträge zur alten Geographie Nordafrikas und zur Atlantisfrage. *Zeitschrift der Gesellschaft für Erdkunde* zu Berlin, 197-216, 1927. ISIS

On the basis of a comparative study of Egyptian and early Greek cosmography, BORCHARDT locates Scheria, HOMER's island of the Phaeacians, on an island in the Lesser Syrtis, where he would also place Atlantis. J. K. W.

Breasted, James Henry. The new crusade. *American Historical Review*, 34, 215-36, 1929. ISIS

A spirited plea to stimulate archaeological research in the Near East and explanation of the activities of the Oriental Institute of Chicago.

Childe, V. Gordon. The most ancient east: the oriental prelude to European prehistory. XIV + 258 p., 24 pl. London, KEGAN PAUL, 1928. ISIS

Englert, Ludwig. Die Geschichte der antiken Naturwissenschaften und der Mathematik und ihre Bedeutung für das humanistische Gymnasium. *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 192-209, 1928. ISIS

Giannitrapani, Luigi. L'Atlantide. *L'Universo*, 8, 1279-1320, 1927. ISIS

Hennig, Richard. Das Rätsel der Atlantis. *Meereskunde*, 14, 1-29, n.d. ISIS

« Theoretisch ist Tartessos jedenfalls wiedergefunden worden [by the researches and excavations of ADOLF SCHULTEN at the mouth of the Guadalquivir], und dieses Tartessos hat die tatsächlichen Unterlagen für PLATOS Schilderung von dem Inselstaat Atlantis geliefert. » J. K. W.

Hennig, Richard. Zum Verständnis des Begriffs « Säulen » in der antiken Geographie. *Petermanns Mitteilungen*, 73, 80-87, 1927. ISIS

HENNIG holds that prior to the fifth cenutry B. C. the « Pillars of Hercules »

signified the Peak of Teneriffe and only with the closing of the Strait of Gibraltar by the Carthaginians did the term come to signify Calpe and Abyla (Rock of Gibraltar and Jebel Musa) on opposite sides of the strait. J. K. W.

Hennig, Richard. Die Kunde von Britannien im Altertum. *Geographische Zeitschrift*, 34, 22-32, 88-108, 1928. ISIS

« Die naive Vorstellung, als ob der Trojanische Krieg das früheste nachweisbare Ereignis europäischer Geschichte gewesen und HOMERS geographisches Weltbild bei den jonischen Inseln zu Ende gewesen sei, ist noch heute nicht ganz ausgestorben. Derartiges mochte gelten, solange wir alle unsere historische Kenntnis lediglich aus der antiken Literatur schöpften. Heute aber ist unser Gesichtskreis durch die erstaunlichen Ergebnisse der Wissenschaft des Spatens ins Riesengrosse erweitert worden, und wie die Geschichte der ersten Mittelmeervölker gut und gern 1500-2000 Jahre früher beginnt, als man noch vor 50 Jahren meinte, so ist auch das Bild ihrer (rohen) Erdkenntnis ganz gewaltig zu erweitern, und in ihm gebührt dem fernen Nordland Britannien eine Rolle ersten Ranges. »

Holman, Bernard W. Copper in antiquity. *Nature*, 122, 998, 1928. ISIS

Dealing with the ancient workings for tin in Transvaal apropos of C. H. DESCH's report on the sources of early Sumerian copper. G. S.

Meyerhof, Max. Au sujet des hydatides palpébrales des anciens. *Annales d'oculistique*, 165, 248-51, 1928. ISIS

Netolitzky, Fritz. Das Atlantisproblem. *Wiener Prähistorische Zeitschrift*, 13, 43-55, 1926. Also Atlantis. Reprint from *Deutsche Zeitung für Spanien*, 11, 1-20, 1926. ISIS

With ADOLF SCHULTEN and RICHARD HENNIG, NETOLITZKY locates Atlantis in the vicinity of Cadiz. J. K. W.

Schulten, Adolf. Die Säulen des Herakles. Reprint from O. JESSEN, « Die Strasse von Gibraltar. », 174-206, 5 illus., 1 pl., Berlin, DIETRICH REIMER, 1927. ISIS

Discussion of the Pillars of Hercules as described by classical writers in connection with the topography of the vicinity of the Strait of Gibraltar. J. K. W.

Stevens, C. G. Ancient writers on Britain. *Antiquity*, 1, 189-196, 1927. ISIS

Brief discussion of Britain as it figures more particularly in the Geography of PTOLEMY, the Antonine Itinerary, the Peutinger Table, the Notitia Dignitatum, the Geography of the Anonymous Geographer of Ravenna, and in the works of ancient historians. J. K. W.

2. — EGYPT.

Gillain, O. La science égyptienne. L'arithmétique au Moyen Empire. 16 + 326 p. Édition de la Fondation Égyptologique Reine Elisabeth, Bruxelles, 1927. (16.75 belgas, outside of France and Belgium). ISIS

Reviewed by RAYMOND CLARE ARCHIBALD, *Isis*, 11, 395-98, 1928.

Lucas, A. Copper in ancient Egypt. *Journal of Egyptian Archaeology*, 13, 162-70, 1927. ISIS

Lucas, A. Notes on the early history of tin and bronze. *Journal of Egyptian Archaeology*, 14, 97-108, 1928. ISIS

Two important notes by an archaeologist who is also a chemist, which throw new light on the sources of the copper and tin used in early oriental bronze. C. H. D.

Rey, Abel. Coup d'œil sur la mathématique égyptienne. *Rev. de synth. hist.*, 41, 19-62, 1926. Nouveau coup d'œil sur la mathématique égyptienne. *Id.* 43, 27-35, 1927. ISIS

Reviewed by KURT VOGEL, *Mitteilungen zur Geschichte der Medizin und der Naturwissenschaften*, 27, 378-83, 1928.

Slomann, H. C. (de Copenhague). Contribution à la paléopathologie égyptienne. *Mémoires de la Soc. d'Anthropologie de Paris.* Séance du 7 avril 1927. ISIS

L'auteur décrit trois différents cas de maladie, réprésentés sur des monuments conservés à la Glyptothèque de Copenhague. 1. La maladie d'Onch-Utus=le mal de Pott. 2. La reine de Pount, qui a eu une luxation congénitale des hanches; et 3. Deux cas de paralysie infantile (Voir HAMBURGER, O, dans le *Bull. d. la Soc. fr. d'Hist. d. la méd.*, 1911 et dans *Janus* 1914). J. W. S. J.

Thompson, D'Arcy Wentworth. On Egyptian fish-names used by Greek writers. *Journal of Egyptian Archaeology*, 14, 22-23, 1928. ISIS

3. — BABYLONIA AND ASSYRIA.

Belaiew, N. T. On the Sumerian mina: its origin and numerical value. Seminarium Kondakovianum, Recueil d'Études; Archéologie, Histoire d'Art, Études Byzantines, II. p. 187-222 (In Russian, with long English abstract.) Prague, 1928. ISIS

Col. BELAIEW has made a critical study of the known Sumerian weights, and this fully documented survey, with its examination of the distribution of errors, leads to the conclusion that the three values $D_1 = 491.14$, $D_2 = 502.20$, $D_3 = 522.8$ grammes may be taken as characteristic for the weights

introduced by king SHULGI. D1 survives in the Russian pound, D2 is the mina of Persia, and D3 survives in the Russian bezmen. Possible relations with Egypt are suggested. C. H. D.

Desch, Cecil H. Copper in antiquity. Report of the British Association Research Committee which is investigating the sources of early Sumerian copper. ISIS

Reviewed in *Nature*, 122, 886, 1928.

Hall, H. R. La sculpture babylonienne et assyrienne au British Museum. (*Ars asiatica*, XI.) 54 p., 60 pl. Paris, VAN OEST, 1928. ISIS

Smith, Sidney. Early history of Assyria to 1000 B. C. XXVIII + 418 p., 24 pl., 2 maps. London, CHATTO and WINDUS, 1928. ISIS

Reviewed by E. BURROWS, *Journal of the Royal Asiatic Society*, 953-57, 1928.

4. — GREECE.

Boffito, Giuseppe. Strumenti antichi di topografia e d'astronomia. *L'Universo*, 8, 729-31, 813-16, 1927; 9, 237-43, 327-33, 1928. ISIS

Deals with the following instruments: 1. the groma and the primitive dioptra; 2. the dioptra of HIPPARCHUS and of HERO OF ALEXANDRIA; 3. the triquetrum (triangle) of PTOLEMY; 4. other instruments of PTOLEMY. J. K. W.

Lippmann, Edmund O. von. Die neuesten Forschungen zur Vorgeschichte der Alchemie. Reprint. 3 p. *Chemiker-Zeitung*, N° 100, 1928. ISIS

Mahaffy, the late Sir **J. P.** and **Goligher, W. A.** Descriptive sociology: or, groups of sociological facts classified and arranged by HERBERT SPENCER. Hellenistic Greeks, compiled and abstracted upon the plan organized by HERBERT SPENCER. 94 p. London, WILLIAMS and NORGATE, 1928. ISIS

Miller, Walter. Daedalus and Thespis. The contributions of the ancient dramatic poets to our knowledge of the arts and crafts of Greece. Volume 1. Architecture and topography. VIII + 329 p., 48 ill. New York, MACMILLAN, 1929 ($ 6.50). ISIS

« The making of this volume has been a long labor of love. The impulse to the study of Greek art as it is presented in the Greek drama came from reading EURIPIDES's Ion at Delphi in my first student days in Greece. The description of the temple-sculptures that EURIPIDES in this tragedy gives suggested the possible wealth of such contributions to our knowledge of the arts and crafts of Greece that might be found in the rest of our corpus dramaticorum. To cull out the passages bearing upon the subject, it has been

my joy, amid all the distractions of a college teacher and executive, to read and reread again and again all the ancient tragedy and comedy we have, including the fragments, to classify and organize the material, and make the combinations that have resulted from the study. » ... « As Volume I has to do with Architecture and topography, so Volume II will deal with the Sculpture, Volume III, with the Painting and ceramics of Greece, as pictured to us by the dramatic poets. It is planned to include in the third volume complete indexes 1) of all the passages cited from the ancient authors; 2) of all the artists named; 3) of the important subjects discussed. » This important work is admirably illustrated, and the abundant Greek quotations are always Englished. Let us hope that the publication of vols. 2 and 3 will not be delayed too long, as the work will not be fully appreciated until the indexes have completed the availability of its rich substance. G. S.

5. — ROME.

London. An inventory of the historical monuments in London. Vol. III., Roman London. Royal commission on Historical monuments. XXI + 207 p. London, H. M. Stationery Office, 1928. ISIS

Müller, Reiner. Einige Bemerkungen über die Lage Alisos. *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 13-28, 2 Abb., 1928. ISIS

Roman Britain. Map of Roman Britain. Second edition. Scale: 16 miles to 1 inch. 16 p., with map. Southampton, Ordnance Survey Office, 1928. ISIS

II. MIDDLE AGES.

6. — MIDDLE AGES (*generalities*).

Asín, Jaime Oliver. Origen árabe de rebato, arrobda y sus homónimos. Contribución al estudio de la historia medieval de la táctica militar y de su léxico peninsular. *Boletín de la Real Academia Española*. vol. 15, 1928. Reprint, 109 p. Tipografia de la Revista de Archivos, Madrid, 1928. ISIS

Very learned doctor's thesis by a nephew of DON MIGUEL ASÍN Y PALACIOS. It is too technical to be analyzed in this journal, and does not fall within our field; yet it deserves to arrest our readers' attention, as an additional example of Muslim influence. G. S.

Bolland, William Craddock. A manual of yearbook studies. (Cambridge Studies in Legal History). XIX + 162 p., 12 pl., Cambridge, University Press, 1927. ISIS

Borenius, Tancred and **Tristram, E. W.** English mediaeval painting. London, Pegasus Press, 1927. ISIS

Born, Lester Kruger. The perfect prince: a study in thirteenth and fourteenth century ideals. *Speculum*, 3, 470-504, 1928. ISIS

Boyce, Gray Cowan. The English-German nation in the University of Paris during the Middle Ages. 232 p. Bruges, Saint Catherine Press, 1927. ISIS

Reviewed by CHARLES H. HASKINS, *Speculum*, 3, 598, 1928 and by ANSON PHELPS STOKES, *American Historical Review*, 33, 855-56, 1928.

Buchheit, Gert. Der Totentanz. Seine Enstehung und Entwicklung. 254 p. Leipzig, Wolkenwanderer-Verlag, 1926. ISIS

Reviewed by PHILIPP STRAUCH in *Deutsche Literaturzeitung*, 1927, 1563-66.

Bugde, Sir E. A. Wallis. The book of the saints of the Ethiopian Church. A translation of the Ethiopic Synaxarium, Mashafa Senkesâr, made from the Manuscripts Oriental 660 and 661 in the British Museum. Four volumes. London, Cambridge University Press, 1928. ISIS

Davison, Ellen Scott (1864-1921). Forerunners of SAINT FRANCIS and other studies. Edited by GERTRUDE R. B. RICHARDS; with a foreword by JAMES T. SHOTWELL. XVI + 425 p., portrait. Boston, HOUGHTON MIFFLIN, 1927. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 145-7, 1928.

Douglas, David C. The social structure of mediaeval East Anglia. Oxford Studies in social life and legal history, edited by the late Sir PAUL VINOGRADOFF, volume 9. Oxford, Clarendon Press, 1927. ISIS

Emden, Alfred B. An Oxford hall in mediaeval times, being the early history of St. Edmund Hall. XVI + 320 p., Oxford, The Clarendon Press, 1927. ISIS

Reviewed by C. W. DAVID, *Speculum*, 3, 414-415, 1928.

Gaselee, Stephen. The Oxford book of mediaeval Latin verse, chosen by STEPHEN GASELEE. XIV + 250 p. Oxford, Clarendon Press, 1928. ISIS

Reviewed by KARL STRECKER, *Deutsche Literaturzeitung*, 5, 1854-1856, 1928.

Grabmann, Martin. Mittelalterliche lateinische Aristotelesüberset-

zungen und Aristoteleskommentare in Handschriften spanischer Bibliotheken. (*Sitzungsberichte der bayer. Akademie der Wissenschaften, philos. philol. Kl.*, 1928, 5) 120 p. München, 1928. ISIS

To indicate the wealth of materials contained in this memoir it will suffice to copy the table of contents. 1. Einleitung; 2. Handschriften der Meteorolgicaübersetzungen. Die Translatio nova ein Werk des WILHELM VON MOERBEKE; 3. Handschriftliche Mitteilungen über die Metaphysica vetus; 4. Des MICHAEL SCOTTUS Uebersetzung der aristotelischen Tiergeschichte und der Abbreviatio de animalibus AVICENNAS; 5. Uebersetzungen der Magna Moralia, der Oekonomik und der Poetria ARISTOTELIS; 6. WILHELMS VON MOERBEKE Uebersetzung des Kommentars des SIMPLIKIOS zu den Kategorien; 7. Handschriftliche Hinweise auf den Meteorologicakommentar des ALFRED VON SARESHEL. Aristoteleskommentare des ADAM VON BOCFELD und ADAM DE BOUCHERMEFORT; 8. Kommentare des BERNARDUS DE SANCIZA, WILHELM VON SAINT-AMOUR, MATTHAEUS VON ORLÉANS, ROBERTUS DE AUCUMPNO u. a. zu logischen Schriften des ARISTOTELES; 9. Eine Wissenschaftslehre und Philosophie der Mathematik im Cod. 3314 der Biblioteca nacional zu Madrid; 10. Kommentare des HEINRICH VON GENT zur Metaphysik und zum Liber de causis. Anonyme Kommentare zu De Caelo et mundo. Der Traktat De gradibus formarum des Dominikaners JOHANNES FAVENTINUS; 11. Medizinische Traktate und der Kommentar des PETRUS HISPANUS zur aristotelischen Tiergeschichte.

Grandgent, Charles Hall. From Latin to Italian. VIII + 191 p. Cambridge, Harvard University Press, 1927. ISIS

Reviewed by EDWARD BUNKER SCHLATTER, *Speculum*, 4, 125-27, 1929.

Hanson, W. G. The early monastic schools of Ireland: their missionaries, saints, and scholars. Four lectures. Cambridge, HEFFER, 1927. ISIS

Hennig, Richard. Hvitramannaland. Ein rätselhaftes Kapitel aus der Geschichte der Erdkunde. *Petermanns Mitteilungen*, 74, 129-133, 1928. ISIS

HENNIG argues against the skeptical views of G. NECKEL, HEINRICH ERKES, and FRIDTJOF NANSEN who identify the Hvitramannaland, or Great Ireland, of the Sagas with the Aran Islands off the west coast of Ireland, with Ireland itself, and with the Islands of the Blessed of classical legend respectively. HENNIG would connect Hvitramannaland with St. Brandan's Isle, the story of which, he believes, did not arise out of mere fancy. He leans toward the theory that there was a pre-Norse settlement of Irish on the east coast of North America, although he admits that there is no definite proof of this. See also H. ERKES, « Nochmals Hvitramannaland, » *Petermanns Mitteilungen*, 74, 284-88, 1928. J. K. W.

Irsay, Stephen d'. The teaching and practice of medicine in the medieval University of Paris. *Bulletin of the Society of Medical History of Chicago*, 4, p. 41, April, 1928. ISIS

Medicine was regularly taught at Paris as early as 1208. The quality of learning was represented by « paraphernalia of commentaries » on the classics of antiquity and the Arabs. The theses representing the end stage of the student were developed by the sic-et-non method with subsequent dialectics. The faculty of medicine conducted a valiant fight against various frauds and quacks. It occasionally participated in medicolegal work. The medical faculty had no control over the surgeons although they attempted to secure it, but they did watch carefully the work of the apothecaries.

C. D. L.

Lot, Ferdinand. La fin du monde antique et le début du Moyen Age. (*Evolution de l'Humanité*, dirigée par HENRI BERR.) XXVI + 513 p. Paris, Renaissance du Livre, 1927. ISIS

Reviewed by M. L. W. LAISTNER, *American Historical Review*, 34, 102-4, 1928.

Mill, Anna Jean. Mediaeval plays in Scotland. University of St. Andrews, 1927. ISIS

Muggenthaler, Hans. Kolonisatorische und wirtschaftliche Tätigkeit eines deutschen Zisterzienserklosters im XII. und XIII. Jahrhundert. (Doerberl-Leidinger, Deutsche Geschichtebücherei, Bd. II) 176 p., 1 fig., 8 maps. München, HUGO SCHMIDT, 1924. ISIS

Patch, Howard, R. The goddess Fortuna in mediaeval literature. XII + 215 p. Cambridge, Harvard Univ. Press, 1927. ISIS

Reviewed by FRIEDRICH BRIE, *Deutsche Literaturzeitung*, 5, 1850-1852, 1928.

Pendrill, Charles. Wanderings in mediaeval London. 256 p. London, ALLEN and UNWIN, 1928. ISIS

Prestage, Edgar. Chivalry: A series of studies to illustrate its historical significance and civilizing influence. By members of King's College, London. XV + 231 p. London, KEGAN PAUL, 1928. ISIS

Raby, Frederic James Edward. A history of Christian-Latin poetry from the beginnings to the close of the Middle Ages. XII + 491 p. Oxford, Clarendon Press, 1927. ISIS

Reviewed by K. STRECKER, *Deutsche Literaturzeitung*, 6, 13-16, 1929

Ribera y Tarragó, Julián. La música de la Jota Aragonesa. Ensayo histórico. 161 p. (Instituto de Valencia de don Juan). Madrid, 1928. ISIS

Sarton George. The sea with a double bottom. (Query nº 11) *Isis*, 11, 127, 1928. ISIS

Schlauch, Margaret. Medieval narrative : a book of translations. VI + 456 p. New York, Prentice-Hall, 1928. ISIS

Reviewed by F. P. MAGOUN, jr., *Speculum*, 4, 129-31, 1929.

Schoepperle, Gertrude (Mrs. G. S. LOOMIS) (1882-1921) Medieval studies in her memory. 535 p. Paris, HONORÉ CHAMPION, 1927. ISIS

Shepard, William P. The Oxford Provençal chansonnier : diplomatic edition of the manusctipt of the Bodleian Library, Douce 269, with introduction and appendices. XX + 251 p. Princeton University Press, 1927. ISIS

Reviewed in *Speculum*, 3, 608-11, 1928 by JOHN R. REINHARD. G. S.

Thompson, James Westfall. An economic and social history of the Middle Ages, 300-1300. IV + 900 p. New York, Century, 1928. ISIS

Reviewed by EUGENE H. BYRNE, *American Historical Review*, 34, 299-301, 1929.

Wlaschky, M. Sapientia artis medicinae. Ein frühmittelalterliches Kompendium der Medizin. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 103-110, 1928. ISIS

Short text represented by four Mss., beginning thus : « Quattuor sunt venti, quattuor anguli caeli, quattuor tempora : vernum, aestivum, autumnum, et hiems, quattuor humores in humano corpore : colera rubea, colera nigra, sanguis et flegma. » « In dieser *Sapientia artis medicinae* haben wir ein kurzes Kompendium der Medizin vor uns. Der Anfang lässt sich zwanglos einreihen in eine Gruppe kleiner Schriften, welche die theoretischen Grundlagen der Medizin zum Gegenstand haben, Schriften, die zumeist in Briefform abgefasst waren. Auch dieser Text wird ja in einer Handschrift als *epistola ypogratis* bezeichnet. Ausgangspunkt dieser Literturgattung mögen der griechische Pseudo-HIPPOKRATES-Brief an PTOLEMÄUS und der griechische Pseudo-DIOKLES-Brief an ANTIGONOS gewesen sein. »... « Die Vierzahl nimmt eine beherrschende Stellung ein. Nach der Vierzahl ist der Kosmos gebaut : vier Winde, vier Himmelsrichtungen, vier Jahreszeiten. So auch vier Säfte im menschlichen Körper. Damit ist die Brücke zwischen Mensch und Kosmos geschlagen. » ... « Ueberblickt man diese *Sapientia artis medicinae* und sucht man sie literar-historisch einzureihen, so kommt man in grosse Verlegenheit. Zweifellos sind mehrere Quellen verarbeitet worden, deren eine VINDICIAN war. Die übrigen entziehen sich jedoch heute noch unserer Kenntnis. Zeitlich möchte ich den Text etwa in das 6. Jahrhundert verlegen. »

G. S.

Zachrisson, R. E. Romans, Kelts and Saxons in ancient Britain : an investigation into the two dark centuries (400-600) of English history. Upsala, ALMQVIST and WIKSELLS, 1928. ISIS

7. — BYZANTIUM.

Byron, Robert. The Station, Athos: Treasures and men. 292 p. London, DUCKWORTH, 1928. ISIS

Diehl, Charles. Les influences de l'art oriental en Occident. *Bulletin of the international committee of historical sciences*, 1, 685-693, 1928. ISIS

Ebersolt, Jean. Orient et occident. Recherches sur les influences byzantines et orientales en France avant les Croisades. 120 p., 26 pl., fig. Paris, VAN OEST, 1929. ISIS

Vasiliev, Aleksandr Aleksandrovich. History of the Byzantine empire. In two volumes. Volume I., From CONSTANTINE THE GREAT to the epoch of the Crusades, A. D. 1081. Translated by Mrs. S. RAGOZIN. (*University of Wisconsin Studies, Social Sciences and History*, n° 13.) 457 p. Madison, University of Wisconsin, 1928. ISIS

Reviewed by ROBERT P. BLAKE, *American Historical Review*, 34, 307, 1929.

III. ORIENTAL SCIENCE AND CIVILIZATION.

8. — ASIA.

Western Asia

Aslan, Kévork. Études historiques sur le peuple arménien. 331 p., 16 pl. Paris, GEUTHNER, 1928 (60 frs.). ISIS

The Avant-propos (dated 1908) contains a discussion of the sources. The author has taken full advantage of the learned studies of the Mekhitarists of Venice and Vienna, of the Armenian Institute of Moscow and of western orientalists. The more critical studies all lead to the conclusion that the history of MOSES OF CHORENE (first half of the fifth century) is hardly trustworthy, with regard not only to the origins but even to the time of the ARSACIDES. Linguistic investigations have proved that the Armenian language belongs to the western branch of Indo-Aryan languages; that is, shows more affinities with Greek and Latin than with Iranian. This would ascribe a western (Phrygian, Thracian?) origin to the Armenians. On the other hand, there is much to favor the theory of the Hittite kinship of the Armenians. « Tel est le résultat des recherches effectuées jusqu'aujourd'hui, en ce qui concerne les origines du peuple arménien. Ce dernier doit être considéré comme le produit de juxtaposition des tribus Arma et Hati, toutes deux originaires de l'Asie Mineure, que les événements politiques ont poussées vers l'est, dans les hautes vallées de l'Euphrate et de l'Araxe. Nous ne possédons, il est vrai, aucun document pour certifier cette conjecture et déterminer l'époque de la migration. Il résulte pourtant de l'ensemble

des faits historiques que la présence des Armeno-Haï, dans les régions du plateau d'Ararat, ne date que du VII[e] siècle avant notre ère. Leur établissement sur ce plateau est donc postérieur aux inscriptions qu'on y trouve. Tous ceux qui déchiffrent les inscriptions ourartiennes affirment que l'idiome de ces inscriptions n'a rien de commun avec l'arménien, tel que nous le connaissons depuis le V[e] siècle.» This volume deals with Armenian history from the origins to the middle of the eleventh century, that is, to the end, if one does not take the Cilician kingdom into account. With that restriction in mind, we may say that the history of the Armenian kingdom begins c. 190 B. C. and ends c. 1050. Of course the history of the Armenian people is another matter; it began much earlier and is still going on. There are 16 beautiful plates but no index. G. S.

Contenau, Georges. L'art de l'Asie occidentale ancienne. (*Bibliothèque d'histoire de l'art.*). 59 p., 64 pl. Paris, VAN OEST, 1928. ISIS

Reviewed by L. DELAPORTE, *Journal des Savants*, 294, 1928.

Herzfeld, Ernest Emil. Die Malereien von Samarra, X + 111 p., 83 illus., 88 pl. Berlin, DIETRICH REIMER, 1927. ISIS

Macler, Frédéric. Contes, légendes et épopées populaires d'Arménie. I. Contes. Traduits ou adaptés de l'Arménien. (*Les joyaux de l'orient*, tome 13). 160 p. Paris, GEUTHNER, 1928 (30 frs.). ISIS

Sartiaux, Félix. Les civilisations anciennes de l'Asie Mineure. 80 p., 60 pl. Paris, RIEDER, 1928. ISIS

Speleers, Louis. Les arts de l'Asie antérieure ancienne. 232 p., 40 pl., 1 map. Bruxelles, Avenue Marie-José, 1926. ISIS

Reviewed by S. RONZEVALLE in *Mélanges de l'université Saint-Joseph*, 12, 210-223, 1927.

Central Asia.

Barthold, W. Turkestan down to the Mongol invasion. Second edition, translated and revised by the author with the assistance of H. A. R. GIBB, (E. J. W. Gibb Memorial Series, new series, 5.) XX + 514 p. London, LUZAC, 1928. ISIS

Reviewed by B. LAUFER, *American Historical Review*, 34, 378, 1929.

Bell, Sir Charles. The people of Tibet. XIX + 319 p., 57 pl. Oxford, Clarendon Press, 1928. ISIS

Cable, Mildred; French, Francesca. Though Jade gate and central Asia: an account of journeys in Kansu, Turkestan, and the Gobi Desert. XVI + 304 p., 12 pl. London, CONSTABLE, 1927. ISIS

Ellam, J. E. The religion of Tibet. A study of Lamaism. (The Wisdom of the East). 127 p. London, MURRAY, 1927. ISIS

Hayden, Sir Henry and **Cosson, César.** Sport and travel in the highlands of Tibet. Introduction by Sir FRANCIS YOUNGHUSBAND. London, COBDEN-SANDERSON, 1927. ISIS

Hübotter, Franz. Zwei tibetische Textfragmente medizinischen Inhalts aus Turfan. Festschrift MAX NEUBURGER gewidmet, 188-91, 2 Abb., Wien, 1928. ISIS

Ikbal Ali Shah, Sirdar. Afghanistan of the Afghans. With numerous photographs and a map. London, KEGAN PAUL, 1928. ISIS

Kazi, Dawasamdup. An English-Tibetan dictionary containing a vocabulary of approximately twenty thousand words with their Tibetan equivalents. XIV + 989 p. Calcutta, University, 1919. ISIS

Reviewed by A. H. FRANCKE, *Deutsche Literaturzeitung*, 5, 1996-1998, 1928.

Landon, Perceval. Nepal. Vol. 1. XXIII + 358 p., 8 pl. Vol. 2. VIII + 363 p., 7 pl. London, CONSTABLE, 1928. ISIS

Reviewed in *Nature*, 122, 874-75, 1928.

Lattimore, Owen. The desert road to Turkestan. XIV + 331 p. London, METHUEN, 1928. ISIS

LeCoq, Albert von. Buried treasures of Chinese Turkestan: an account of the activities and adventures of the second and third German Turfan expeditions. Translated by ANNA BARWELL. 180 p. 52 pl. London, ALLEN and UNWIN, 1928. ISIS

LeCoq, Albert von. Von Land und Leuten in Ostturkistan. Berichte und Abenteuer der vierten Deutsche Turfanexpedition. VIII + 183 p., 48 pl. Leipzig, HINRICH, 1928. ISIS

Morden, William J. Across Asia's snows and deserts. Introduction by ROY CHAPMAN ANDREWS. XIV + 415 p., 65 ill. London, PUTNAM, 1927. ISIS

Niedermayer, Oskar von. Afghanistan. XVI + 70 + 246 p., 246 fig. + 9 sketches. Leipzig, HIERSEMANN, 1924. ISIS

Reviewed by M. GASTER, *Journal Royal Asiatic Society*, 165-6, 1928.

Waldschmidt, Ernst. Gandhara Kutscha Turfan. Eine Einführung

in die früh mittelalterliche Kunst Zentralasiens. 110 p., 1 map, 65 pl. Leipzig, KLINKHARDT und BIERMANN, 1925. ISIS

Reviewed by J. HACKIN, *Revue des Arts Asiatiques*, 4, 176-77, 1928.

Eastern Asia.

(*Including works relative to the whole of Buddhist Asia, or to India, Central and Eastern Asia combined.*)

Evans, Ivor Hugh Norman. Papers on the ethnology and archaeology of the Malay Peninsula. x + 164 p., 43 pl. Cambridge, University Press, 1927. ISIS

Ferguson, John C.; Anesaki, Masaharu. Chinese-Japanese mythology. (The mythology of all races in thirteen volumes. Vol. 8) XVI + 416 p. Boston, Mass., MARSHALL JONES, 1928. ISIS

Krom, Nicolaas Johannes. Hindoe-Javaansche Geschiedenis. IV + 494 p., 2 maps. s'Gravenhage, NIJHOFF, 1926. ISIS

Reviewed by C. O. BLAGDEN, *Journal of the Royal Asiatic Society*, 912-16, 1928.

Lamster, J. C. Handelreizen in Oost-Indië, Voor 2000 Jaar. *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, 2e reeks, Dl. 45, no 6, 991-98, 1928. ISIS

Langlet, E. Dragons et génies. Contes rares et récits légendaires inédits recueillis oralement au pays d'Annam et traduits. 228 p. (*Les joyaux de l'orient*, tome 7). Paris, GEUTHNER, 1928 (40 frs.). ISIS

Van Eerde, J. C. De oudste berichten omtrent den indischen archipel. *Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap*, 45, 577-90, 1928. ISIS

9. — INDIA.

Acharya, Prasanna Kumar. Indian architecture according to Mânasâra-Silpasâstra. IV + 268 p. Oxford University Press, 1927. ISIS

Reviewed by H. C., *Journal of the Royal Asiatic Society*, 943-45, 1928.

Acharya, Prasanna Kumar. A dictionary of Hindu architecture treating of Sanskrit architectural terms, with illustrative quotations

from Silpasâstras, general literature and archaeological records. II + 861 p. London, Oxford University Press, 1928. ISIS

Reviewed by STEN KONOW, *Deutsche Literaturzeitung*, 5, 659-61, 1928.

Altekar, Anant Sadasiv. A history of village communities in western India. HUMPHREY MILFORD, Oxford University Press, 1928. ISIS

Reviewed by P. R. CADELL in *Journal of the Royal Asiatic Society*, 682-87, 1928.

Bonnerjea, Biren. L'ethnologie du Bengale. XX + 169 p. Paris, GEUTHNER, 1927. ISIS

Reviewed by C. E. A W. O., in *Journal of the Royal Asiatic Society*, 688-89, 1928.

Chatterji, Bijan Raj. Indian cultural influence in Cambodia. XV + 303 p. Calcutta, University Press, 1928. ISIS

Crinivasa, Aiyangar P. The stone age in India. Being the Sir S. Subrahmanya Ayyar Lecture delivered on December 10, 1925. 55 p. Madras, Superintendent, Government Press, 1926. ISIS

Cumming, Sir John Ghest. Bibliography relating to India (1900-1926). 16 p. London, National Book Council, 1927. ISIS

Dahlke, Paul. Buddhism and its place in the mental life of mankind. London, MACMILLAN, 1927. ISIS

Reviewed by EDWARD J. THOMAS, *Journal Royal Asiatic Society*, 174-75, 1928.

Das, Sukumar Ranjan. Coordinates used in Hindu astronomy. *American Mathematical Monthly*, 35, 535-40, 1928. ISIS

« It may be said in conclusion that the coordinates used in Hindu astronomy, though not explicitely stated, were more or less the same as are used in modern astronomy. »

Das, Sukumar Ranjan. The equation of time in Hindu astronomy. *American Mathematical Monthly*, 35, 540-43, 1928. ISIS

« The equation of time is the difference of the right ascensions of the true sun moving along the ecliptic and the mean sun moving along the equator. It has two parts; the difference in the right ascensions of the true sun and a fictitious star moving along the ecliptic with the mean motion of the sun is one part of the equation of time; while the difference of the right ascensions of the mean sun moving along the equator and this fictitious star is the other part. The former is called bhujântara and the latter udayântara in Hindu astronomy. The Sûrya Siddhânta is content with only having applied the bhujântara correction. It was BHÂSKARA who first of all Hindu astronomers detected this udayântara correction. »

Datta, Bibhutibhusan. The science of calculation by the board. *American Mathematical Monthly*, 35, 520-29, 1928. ISIS

« The theory which the present writer has here suggested with a view to solving what has hitherto remained a knotty problem of the history of mathematics can be briefly summarised thus : First, on the Arabian side : (1) the terms hisâb al-takht and kitâb al-takht of the eastern Arabs are nothing else than the Arabic version of the Sanskrit pâṭîgaṇita or pâṭîsâstra ; (2) the hisâb al-ghobâr and other similar terms of the western Arabs are mere adaptations of the older Sanskrit term dhûli-karma ; Secondly, on the Hindu side : the terms pâṭîgaṇita and dhûli-karma originated and grew primarily as the name of a type of mathematics for which some kind of writing materials was found indispensable, in contradistinction to two other more elementary types of arithmetic, namely the mental arithmetic and the finger arithmetic. In the case of the first term the writing materials contemplated were the wooden board and a piece of soapstone ; and in case of the other they were the stylus and a wooden board covered with a layer of fine sand or dust. In either case the board was never meant to be a means of indicating the place value and the zero. This theory is more comprehensive than that of GANDZ, since it embraces also the Hindu side which he has overlooked. Indeed GANDZ's theory fails to explain the origin and source of the Hindu terms. Again, from the fact that the western Arabs adopted and continued to use a term which went practically into disuse in the land of its birth, there follows the irresistible conclusion that the Hindu arithmetic reached the Arabs of the West long before it reached the Arabs of the East. Hence the present theory is in perfect accord with and is a kind of corroboration of the ingenious theory of WOEPCKE relating to the differences between the Hindu numerals of the eastern and the western Arabs. »

Dutt, Nalinaksha. The early history of Buddhism and the Buddhist schools. With a foreword by NARÊNDRA NATH LAW. London, LUZAC, 1925. ISIS

Ganguli, Sarada Kanta. The source of the Indian solution of the so-called Pellian equation. *Bull. Calcutta mathematical society*, 19, 151-76, 1928. ISIS

« The equation $Nx^2 + 1 = y^2$ has been erroneously named after PELL who had no connection with it. So far as our present knowledge goes, the first Indian who attempted to find integral solutions of the equation and was partially successful is BRAHMAGUPTA, as we shall see later on. »...
« (1) It is not likely that DIOPHANTUS solved the Pellian equation in the lost Books of the Arithmetica. (2) For his solution of the so-called Pellian equation BHÂSKARA is indebted to BRAHMAGUPTA and ÂRYABBAṬA and not to any other source. (3) KAYE's low estimate of BRAHMAGUPTA is based on a very serious misreading of facts. BRAHMAGUPTA's important contributions to the solution of the Pellian equation in integers are not due to Greek influence and inspiration. (4) ÂRYABHAṬA's solution of indeterminate equations of the first degree on which BHÂSKARA's solution of the Pellian equation partially depends was evolved, by easy and natural steps, from the first four simple rules and not from any foreign source. (5) The hypo-

thesis of the ultimate Greek or foreign origin of the Indian solution of the so-called Pellian equation, therefore, cannot stand ». Apropos of the Pellian equation, see J. M. CHILD : Did FERMAT have a solution of it ? (*Isis*, 3, 255-62).

Getty, Alice. The gods of northern Buddhism. Their history, iconography, and progressive evolution through the northern Buddhist countries. With a general introduction on Buddhism translated from the French of J. DENIKER. Illustrations from the collection of HENRY H. GETTY. LII + 220 p., 67 pl. Oxford, Clarendon Press, 1928. ISIS

This is a new edition, revised and enlarged. The first edition appeared in 1914.

Ghoshal, U. N. A history of Hindu political theories. From the earliest times to the end of seventeenth century. XVII + 257 p. London, Oxford University Press, 1927. ISIS

Reviewed by J. J. MEYER, *Deutsche Literaturzeitung*, 5, 2126-29, 1928.

Haig, Sir Wolseley (*editor*). The Cambridge history of India. Vol. III. Turks and Afghans. XXXII + 752 p., 51 pl., 8 maps, Cambridge, University Press, 1928. ISIS

This volume deals generally with the history of India under Muhammadan rule from the time of the earliest invasions of the Muslims to the overthrow of the LODÎ dynasty on the field of Pânîpat and the establishment of BÂBUR THE TÎMÛRÎD on the throne of Delhi, that is, from about 1200 A.D. to the middle of the 16th century. »

Heras, Henry. The Aravidu dynasty of Vijayanagara. With a preface by Sir RICHARD CARNAC TEMPLE. Vol. I., 1542-1614. XLIV + 681 p. Madras, B. G. PAUL, 1927. ISIS

(Kâlidâsa). Megha-dûta, or the Cloud messenger by KÂLIDÂSA. Translated from Sanskrit into Ukrainian verse with preface and notes by PAUL RITTER. Appendix : RABINDRANATH TAGORE's Essay Megha-dûta translated from Bengali into Ukrainian. 48 p., 2 pl. Kharkow, Ukrainian Society for Oriental Research, 1928. ISIS

Kirfel, Willibald. Das Nidânasthâna im Garudapurâna. GARBE-Festschrift, S. 102-108. Erlangen, PALM and ENKE, 1927. ISIS

Marvin, Francis Sydney. India and the West, a study in cooperation. VIII + 182 p. London, LONGMANS, 1927. ISIS

Meyer, Johann Jakob. Ueber das Wesen der altindischen Rechtschriften und ihr Verhältnis zu einander und zu KAUTILYA. IX + 440 p. Leipzig, O. HARRASSOWITZ, 1927. ISIS

Reviewed by L. D. BARNETT, *Journal Royal Asiatic Society*, 429-33, 1928.

Mookerji, R. K. B. Rasa-Jala-Nidhi or Ocean of Indian chemistry and alchemy. Vol. I. Compiled in Sanskrit by RASACHARYA KAVIRAJ BHUDEB MOOKERJI. With English translation by the author. Published by the author, Calcutta, n.d., 1927. ISIS

Apparently Ayurvedic pharmacy and chemistry, interesting but without historical value — for there appears to be no means of fixing the source and date of the processes. In the Preface the author states that « Rasavidya, or chemistry including alchemy, began to be cultivated by the ancient Aryas as early as the beginning of the present Kalpa, i.e. more than 1,950,000,000 years back. » ! T. L. D.

Mookerji, R. K. Bhudeb. Indian civilisation and its antiquity. Calcutta, 41a Grey Street, 1928. ISIS

Müller, Reinhold F. G. Zur altindischen Geburtshilfe. *Archiv für Geschichte der Medizin*, 20, 233-71, 5 Textfiguren, 1928. ISIS

Muthu, David C. A short account of the antiquity of Hindu medicine. 2. ed., 53 p. London, BALLIÈRE, TINDALL and COX, 1927. ISIS

Ranade, R. D. A constructive survey of Upanishadic philosophy. Being a systematic introduction to Indian metaphysics. 438 p. Poona, Oriental Book Agency, 1926. ISIS

Reviewed by J. N. FARQUHAR, *Journal of the Royal Asiatic Society*, 172-3, 1928.

Raychaudhuri, Hemchandra. Political history of ancient India from the accession of Parikshit to the extinction of the Gupta dynasty. 2nd edition. XIX + 416 p. University of Calcutta, 1927. ISIS

Reviewed by C. E. A. W. O., in *Journal of the Royal Asiatic Society*, 689-92 1928.

Sarup, Lakshman. The Nighantu and the Niruka. The oldest Indian treatise on etymology, philology, and semantics. Lahore, MOTILAB BANARSI DAS, 1920. ISIS

Warmington, Eric Herbert. The commerce between the Roman Empire and India. XII + 417 p. Cambridge, University Press, 1928. ISIS

Reviewed by HALFORD L. HOSKINS, *American Historical Review*, 34, 153, 1928.

10. — CHINA.

Berkey, Charles P. and **Morris, Frederick K.** Geology of Mongolia : a reconnaissance report based on the investigations of the years 1922-23. (Central Asiatic Expeditions : Natural History of Central Asia, vol. 2.) XXXI + 475 p., 44 pl., 6 maps. New York, American Museum of Natural History, 1927. ISIS

Reviewed by J. W. G., *Nature*, 122, 303-04, 1928.

Chao, Yuen-ren. A phonograph course in the Chinese national language. Text in English, XXIV + 288 p. ($ 2.50). Accompanied by a set of twelve double-sided Columbia records ($ 36. per set; $ 3.50 each). Shanghai, Commercial Press. ISIS

The phonetic records give for the twenty-four lessons the exact intonation, pronunciation, and tones of the Chinese spoken language. The textbook gives in each lesson (1) introductory remarks, (2) the lesson in Chinese characters and Chinese phonetic symbols, (3) the lesson in international phonetics, (4) the English translation, and (6) notes in English. Grammatical rules of the Chinese national language are fully discussed.

Eckstein, Oskar. Syphilis in ancient China. *Bulletin of the Society of Medical History of Chicago*, 4, p. 74, April, 1928. ISIS

« There is good reason to affirm that syphilis did occur in China in pre-Columbian days. » C. D. L.

Forke, Alfred. Geschichte der alten chinesischen Philosophie. XVI + 594 p. Hamburg, FRIEDERICHSEN, 1927. ISIS

Reviewed by ERICH SCHMITT, *Deutsche Literaturzeitung*, 5, 2250-53, 1928.

Hummel, Arthur W., and **Swingle, Walter T.** Division of Chinese literature. Report of the Librarian of Congress for 1927-28, p. 271-316, Washington, 1928. ISIS

The Chinese collection of the Library of Congress, which is only thirty years old, has already become the richest of its kind outside of China and Japan. It now numbers over 100,000 volumes. For the past eight years reports on its growth have been written by WALTER T. SWINGLE, of the U. S. Department of Agriculture — and these reports have been regularly analyzed in *Isis* (for the last one see vol. 11,509). This year we have a double report, written partly by SWINGLE and partly by the newly appointed chief of the division, ARTHUR W. HUMMEL. These two reports are so elaborate, so rich, and so long, that it is out of the question to analyze them here. They contain as usual, shorter sections devoted to Korean, Japanese, and Tibetan books. Among the many accessions I shall quote only two : a facsimile copy of a scroll of the Hifuyaku (in Chinese, Mi fu lüeh) a Japanese encyclopaedia compiled by SHIGENO SADANUSHI, by order of the emperor YUNNA, completed in 841 ; sets of the Kanjur and Tanjur (see my *Introduction*, vol. 1, 467-69) printed at Choni, in Kansu. Another set of the Tanjur p r in

at Narthang, in Central Tibet, which BERTHOLD LAUFER had obtained in 1908 for the John Crerar Library, is now also in the Library of Congress. Finally the Library has owned for many years W. W. ROCKILL's copy of the Kanjur, printed at Derge. I must still mention that HUMMEL's fine collection of Chinese maps has been deposited by him in the Library. I hope that some way will be found to buy it and present it to the Library, in order that it may remain there permanently; it would fittingly complete its unique series of gazetteers. A brief account of HUMMEL's collection may be read in the report of the Division of maps, p. 91. G. S.

Liang Chi-chao. Archeology in China. *Annual report of the Smithsonian Inst. for* 1927, 453-66, Washington, 1928. ISIS

Li, Chi. The formation of the Chinese people: An anthropological inquiry. 285 p. Cambridge, Mass., Harvard University Press, 1928. ISIS

Maspero, Henri. The origins of the Chinese civilizations. Translated from *Annales de Géographie*, n° 194, 35e Année, 1926. *Annual report of the Smithsonian Inst. for* 1927, 433-52, Washington, 1928. ISIS

Maspero, Henri. La Chine antique. T. IV de l'Histoire du monde publiée sous la direction de E. CAVAIGNAC. XVI + 626 p., 3 cartes. Paris, E. DE BOCCARD, 1927. ISIS

Les deux cents dernières pages de ce volume, qui trace l'histoire de la Chine, pour autant qu'elle puisse être actuellement connaissable, jusqu'au triomphe du royaume de Ts'in (221), sont consacrées à la littérature et à la philosophie antiques, étudiées en neuf chapitres: 1. les origines de la littérature; 2. CONFUCIUS, MO-TSEU et les métaphysiciens; 3. l'école taoiste; 4. les écoles nuancées de taoisme; 5. l'école de MO-TSEU et les sophistes; 6. l'école de CONFUCIUS aux IVe et IIIe siècles; 7. le roman historique et l'histoire; 8. le renouveau de la poésie chinoise aux IVe et IIIe S.: K'IU YUAN; 9. le mouvement scientifique et les influences étrangères. Ce dernier chapitre indique les rudiments de connaissances géographiques et astronomiques que possédaient les Chinois avant l'introduction des éléments étrangers, vers le Ve siècle. L. G.

Mikami, Yoshio. The Ch'ou-Jen Chuan of YÜAN YÜAN. *Isis*, 11, 123-26, 1928. ISIS

Criticism of Father VAN HÉE's study published in *Isis*, 8, 103-18.

Zenker, Ernest Victor. Geschichte der chinesischen Philosophie. Zum ersten Male aus den Quellen dargestellt. II. Bd.: Von der Han-Dynastie bis zur Gegenwart. XI + 340 S. Reichenberg i.B., STIEPEL, 1927. ISIS

Reviewed by A. FORKE, *Deutsche Literaturzeitung*, 1397-1401, 1928.

11. — JAPAN.

Nachod, Oskar. Bibliography of the Japanese Empire 1906-1926. Being a classified list of the literature issued in European languages since the publication of Fr. VON WENCKSTERN's Bibliography of the Japanese Empire up to the year 1906. In two volumes. Volume 1., Nos. 1-4019. XVI + 384 p. Volume II., Nos. 4020-9575, p. 385-832. London, GOLDSTON, 1928. ISIS

12. — ISRAEL.

Eisenstein, J. D. Ozar Massaoth, a collection of itineraries by Jewish travellers to Palestine, Syria, Egypt and other countries... with maps, notes and index. Selected and edited. 352 p. New York (vol. 1, Hebrew text, privately published), 1926. ISIS

Reviewed by JOSHUA FINKEL, *Isis*, 11, 147-9, 1928.

Marx, Alexander. The translation of HIPPOCRATES's Aphorisms by JACOB IBN ZABARA. Devîr, vol. 2, 208-12, (in Hebrew). ISIS

An account of the Hebrew translation, represented by a Ms. in the Jewish Theological Seminary, New York, already referred to in *Isis*, 11, 512.

G. S.

Marx, Alexander. SAMUEL POZNANSKI (1864-1921). *Revue des études juives*, n° 148, p. 169-208, 1922. ISIS

Biography of a great scholar, who was the foremost authority on Jewish sects, chiefly on the Qaraites, and on Judaeo-Arabic literature. Followed by a bibliography (1889-1921) compiled with the assistance of POZNANSKI's son, EDWARD. G. S.

Marx, Alexander. The Darmstadt Haggadah. With notes on illuminated Haggadah Mss. *Jewish Quarterly Review*, 19, 16 p., 1928. ISIS

Morrison, Hyman. The early Jewish physicians in America with reference to some in the nineteenth century. *Medical life*, 35, 505-30, illus., 1928. ISIS

Nicolsky, Nicolaj. Spuren magischer Formeln in den Psalmen. Übersetzung des russischen Manuskriptes von GEORG PETZOLD. (*Beihefte zur Zeitschrift für die alttestamentliche Wissenschaft*, 46.) 100 p. Giessen, A. TÖPELMANN, 1927. ISIS

Odeberg, Hugo. 3 Enoch, or the Hebrew book of ENOCH. Edited and translated for the first time with introduction, commentary and critical notes. 405 p. Cambridge University Press, 1928. ISIS

13. — IRAN.

Herzfeld, Ernst. Archaeologische Mitteilungen aus Iran. Band I. Heft 1, 64 S., 33 Taf. 2 Karten, Januar, 1929. Berlin, DIETRICH REIMER. ISIS

Morgan, Jacques de. La préhistoire orientale. Ouvrage posthume publié par LOUIS GERMAIN. T. III. L'Asie antérieure. VI + 460 p., 380 fig., 3 pl. h-t. P. GEUTHNER, Paris, 1927 (les 3 vol. 300 frs). ISIS

Avec ce volume se termine l'ouvrage consacré par J. DE MORGAN à la préhistoire orientale (*Isis*, 8, 519-21 ; 10,217). L'auteur y utilise les documents recueillis par lui au Caucase (1886), en Perse (1889-91), et ceux, très nombreux, qui devaient sortir sous sa direction, en Perse de nouveau, de fouilles poursuivies de 1897 à 1908. Ce sont ces fouilles qui mirent au jour la stèle de Naram-Sin, le code de Ḫammourabi, la statue de la reine Niparasou, la curieuse céramique peinte de l'Elam, et les inscriptions élamites si bien déchiffrées par V. SCHEIL (plus de 60 fig. sont relatives à des trouvailles faites à Suse). L'ouvrage est surtout consacré à la céramique susienne et à l'industrie dans le Nord de l'Asie Antérieure. Il se termine par un précieux index de 44 pp. qui vaut pour les trois volumes. L. G.

14. — ISLAM.

Ali, The right hon. **Syed Ameer** (1849-1928). Obituary notice by A. YUSUF ALI. *Journal of the Royal Asiatic Society*, 986-89, 1928. ISIS

Almkvist, Johan. Ueber die Anwendung des Quecksilbers bei den alten Arabern. Festschrift MAX NEUBURGER gewidmet, 5-15, Wien, 1928. ISIS

« Früher als im arabischen Reiche war das Quecksilber in Indien benutzt und geschätzt, und man kann deshalb, wenn unsere jetzigen Kenntnisse richtig sind, die indische Kultur als den Ursprung der Quecksilberbehandlung bezeichnen; seit das Quecksilber aber seinen Weg aus Indien über Persien zum arabischen Reiche gefunden hat, hat die arabische Kultur den Grund zum wissenschaftlichen Studium des Quecksilbers gelegt. Mit der arabischen Kultur beginnt also das wissenschaftliche Studium der Quecksilberfrage. Hier, wie in den übrigen Zweigen der Naturwissenschaft und der Medizin, haben die Araber ein Beispiel gegeben, wie sie die von anderen Völkern übernommene Wissenschaft so gepflegt und gefördert haben, dass sie einen festen Grund für fortgesetztes naturwissenschaftliches Studium legten. »

Barthold, W. Orta Asia Türk tarikhi ḥaqqinda dersler. 8-222-20 p. (in Turkish). Constantinople : EVQAF MAṬBA'ASI, 1927. ISIS

Reviewed by G. L. M. CLAUSON, *Journal of the Royal Asiatic Society*, 926-29, 1928.

Basset, René (1855-1924). Le dîwân de 'ORWA BEN EL WARD. (*Publi-*

cations de la Faculté des lettres d'Alger, 1e série, Bulletin de correspondance africaine, tome 62). 75 p. Paris, GEUTHNER, 1928 (25 frs.) ISIS

« 'ORWA BEN EL WARD, un des BANÛ-'ABS, comme 'ANTARA, l'un des poètes les plus remarquables de l'ancienne Arabie, est le type de ces poètes nomades, pillards et chevaleresques — d'où son surnom, 'ORWAT EṢ ṢA'ÂLÎK (Orwa des gueux) — n'ayant pas fréquenté comme ṬARAFA, LABÎD, MOTALAMMIS, ' AMR BEN KOLTHÛM et d'autres les cours de Ḥîra ou de Ghassân, ou comme IMROU'L QAIS celles du Yémen et de Constantinople. De là le charme particulier de sa poésie, bien qu'on puisse douter qu'elle nous soit parvenue dans toute sa rudesse primitive.

« Son Dîwân fut publié pour la première fois par NÖLDEKE; et, peu après, R. BOUCHER donnait dans le *Journal asiatique* une étude intéressante. Le recueil connu sous le nom de Khamsa dawâwîn reproduisit l'édition de NÖLDEKE. Le P. CHEÎKHO donna dans ses Poètes arabes chrétiens la presque totalité du Dîwân avec des notes tirées pour la plus grande partie de l'Aghânî. »

Goichon, (Mlle.) A. M. La vie féminine au Mzab. Étude de sociologie musulmane. XIV + 348 p., 19 pl. Paris, GEUTHNER, 1927.

Reviewed by E. PRÖBSTER, *Deutsche Literaturzeitung*, 6, 238-39, 1929.

Hug, Georges; Habachi, Guirguis. Pour apprendre l'Arabe. Manuel du dialecte vulgaire d'Egypte. Grammaire, vocabulaire, dialogues. 135 p. Paris, GEUTHNER, 1928 (20 frs). ISIS

Lévi-Provençal, E. Documents inédits d'histoire almohade. Fragments manuscrits du « legajo » 1919 du fonds arabe de l'Escurial, publiés et traduits avec une introduction et des notes (*Textes arabes relatifs à l'histoire de l'occident musulman*, vol. 1). XII + 276 p., 4 facs., 2 cartes, Paris, GEUTHNER, 1928 (160 frs.). ISIS

Three important acephalous texts which had remained hitherto unnoticed, because they were included in an unclassified bundle of loose papers (legajo). The first and least important contains letters ascribed to the Mahdî IBN TUMART (d. c. 1129) and to the founder of the Almohade dynasty 'ABD AL-MU'MIN (d. 1163). The second is an extract from the Kitâb al-ansâb fî ma'rifat al-aṣḥâb, dealing with the genealogy of the Almohade leaders and the organisation of their party. The third, by far the largest and most important, is a history of the Almohades by one ABÛ BAKR IBN 'ALÎ AL-ṢANHÂJÎ, called AL-BAIDHAQ, who was a companion of the Mahdî and later of 'ABD AL-MU'MIN. These personal reminiscences are very valuable and the more so because they have been hardly used thus far except in the Kitâb al-'ibar of IBN KHALDÛN and in the Kitâb al-ḥulal-maushîya fî-l-akhbâr al-marrâkushîya, wrongly ascribed to LISÂN AL-DÎN IBN AL-KHAṬÎB. The Arabic text of these documents is followed by a French translation, abundant notes, and two maps. G. S.

Ruska, Julius. Zwei Bücher De compositione alchemiae und ihre

Vorreden. *Archiv für Geschichte der Mathematik, der Naturwissenschaften und der Technik*, 11, 28-37, 1928. ISIS

« Im ersten Bande seiner « *Bibliotheca Chemica Curiosa* » hat J. J. MANGET nach älteren Drucken S. 509 ff. ein dem MORIENUS ROMANUS zugeschriebenes Buch *De compositione alchemiae* abgedruckt, das in neuerer Zeit mehrfach zum Gegenstand literarischer Untersuchungen gemacht worden ist. Nach der Ueberschrift soll es von ROBERTUS CASTRENSIS aus dem Arabischen ins Lateinische übersetzt worden sein; eine *Praefatio Castrensis* betont noch besonders die Ungeübtheit des Uebersetzers, die Nachschrift ‚S. 519, den genauen Zeitpunkt der Uebersetzung.

« In meiner Arbeit über CHALID IBN JAZID habe ich die Echtheit der *Praefatio* mindestens aber ihre Zugehörigheit zu dem *Liber de compositione alchemiae* des Morienus bestritten. Einen wesentlichen Schritt weiter kam ich bei meinen Studien zur *Tabula Smaragdina*, als ich eine in den Hauptpunkten mit der *Praefatio Castrensis* übereinstimmende Vorrede auch einem dem HERMES TRISMEGISTOS zugeschriebenen Werk *De compositione alchemiae* vorangesetzt fand. Ich komme auf die damals in Aussicht gestellten Untersuchungen zur Echtheitsfrage jetzt zurück, nachdem sich für die Geschichte der Uebertragung der arabischen Chemie nach dem Westen weitere bedeutsame Ergebnisse gefunden haben. »

Scholem, Gerhard. Sefer ha-tamar. Das Buch von der Palme des ABU AFLAḤ aus Syracus. Ein text aus der arabischen Geheimwissenschaft. Nach der allein erhaltenen hebräischen Uebersetzung. Herausgegeben und übersetzt von G. SCHOLEM. 59 + 50 p. Part I, Jerusalem, 1926; Part II, Hannover : HEINZ LAFAIRE, 1927. ISIS

Reviewed by M. GASTER in *Journal of the Royal Asiatic Society*, 698, 1928.

Sékaly, Achille. L'Université d'El-Azhar et ses transformations. *Revue des Etudes Islamiques*, vol 1, 465-529, 1927; vol. 2, 47-165, 255-337, 401-73, 1928. ISIS

Stapleton, H. E., the late **Azo, R. F.,** and **Husain, M. Hidâyat.** Chemistry in'Iraq and Persia in the tenth century A. D. *Memoirs of the Asiatic Society of Bengal*, 8, 317-418, Calcutta, 1927. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 129-34, 1928.

Täschner, Franz. Das anatolische Wegenetz nach osmanischen Quellen, II. Band (*Türkische Bibliothek*, 23). VIII + 142 S., 14 Taf., 1 Karte. Leipzig, MAYER und MÜLLER, 1926. ISIS

Reviewed by R. HARTMANN, *Der Islam*, 16, 303-06, 1927. The first part appeared in 1924 (*Isis*, 7, 573).

PART III.

SYSTEMATIC CLASSIFICATION.

Including only the material which could not be included in Parts I and II. Hence studies on Japanese astronomy or on XIIIth century astronomy are not classified below under astronomy, but above, respectively under Japan (in Part II) and XIIIth Century (in Part I).

The sections forming Part III are classified as follows:

I. *Science in general* : 15. Bibliography; 16. History; 17. Organization; 18. Philosophy.

II. *Formal sciences* (Knowledge of forms) : 19. Logic and Theory of Knowledge; 20. Mathematics; 21. Statistical methods.

III. *Physical sciences* (Knowledge of inorganic nature); 22. Mechanics ; 23. Astronomy; 24. Physics ; 25. Chemistry (Physico-chemistry Industrial chemistry); 26. Technology.

IV. *Biological sciences* (Knowledge of organic nature) : 27. Biology (Generalities, « Natural history »); 28. Botany (Agronomy, Phytopathology, Palaeobotany); 29. Zoology.

V. *Sciences of the earth* (implying knowledge of both organic and inorganic nature): 30. Geodesy; 31. Geography and Oceanography ; 32. Geology, Mineralogy, Palaeontology, Mining ; 33. Meteorology, Climatology and Terrestrial Physics.

VI. . *thropological and historical sciences* (Knowledge of man, past and present): 34. Anatomy; 35. Physical anthropology (anthropometry and races of man); 36. Physiology (human and comparative); 37. Psychology (human and comparative) ; 38. Archaeology (generalities, methods); 39. Prehistory; 40. Ethnology (primitive and popular science); 41. Superstition and Occultism.

42. Economics (economic doctrines and history; commerce; transportation and communications); 43. Sociology, Jurisprudence and Positive Polity ; 44. History of Civilization (general history historical methods, biography and chronology); 45. History of Art (Art and science; Iconography; Arts and crafts); 46. History of Language, Writing and Literature; 47. History of Morals (Moral organization of society); 48. History of Philosophy; 49. History of Religion (Science and religion).

VII. *Medicine* : 50. History, organization and philosophy of medicine ; 51. Epidemiology, History of special diseases. Public health and Social medicine; 52. History of hospitals and of medical teaching; 53. Pharmacy; Pharmacology; Toxicology.

VIII. *Education* (The methods of accumulating, imparting and diffusing knowledge); 54 Education (Generalities, Methods, Colleges, Universities) ; 55. Academies, societies, congresses, National and international organization of science; 56. Bibliography. (Methods, Libraries) ; 57. Museology (Museums and Collections).

IX. 58. Alia; 59. Errata.

The applied sciences are not disconnected from the pure sciences, but, as far as possible, the principles and applications of science are considered in the same section. However, applications based upon the principles of many sciences are dealt with separately (e. g., technology; medicine; education).

I. SCIENCE IN GENERAL.

16. — HISTORY OF SCIENCE.

Dannemann, Friedrich. Vom Werden der naturwissenschaftlichen Probleme: Grundriss einer Geschichte der Naturwissenschaften. XII + 376 p. Leipzig, ENGELMANN, 1928. ISIS

This is a summary of the author's larger work Die Naturwissenschaften in ihrer Entwicklung und in ihrem Zusammenhange (second ed., 4 vols., same publisher, 1920-23; *Isis*, 6, 115).

Gunther, R. T. Fourth annual report for 1927 of the Committee of management of the Lewis Evans Collection, Oxford, 6 p. ISIS

Raeder, Hans. JOHAN LUDVIG HEIBERG (1854-1928). *Isis*, 11, 367-74, portrait, 1928. ISIS

Sarton, George. Introduction to the history of science. Vol. 1, From HOMER to OMAR KHAYYAM. XII + 839 p. (*Carnegie Institution of Washington*, Publication n° 376). Baltimore, WILLIAMS and WILKINS, 1927 ($ 10.). London, BAILLIERE, TINDALL and COX, 1927 (45 sh.). ISIS

Reviewed by MIRCEA ELIADE in *Cuvântul*, Bucarest, Nov. 11, 1928; by E. J. HOLMYARD in *Journal Royal Asiatic Society*, 209-11, Jan. 1929; by HÉLÈNE METZGER in *Revue des études juives*, 86, 109-10, Paris, 1928.

Sarton, George. Preface to volume eleven. *Isis*, vol. 11, 5-14, 1928. ISIS

Dealing with PASTEUR, EVA LE GALLIENNE, etc.

Sarton, George. Tenth report to the Carnegie Institution of Washington. *Carnegie Institution Year Book n°* 27, 1927-28, p. 364, 1928. ISIS

1. Introduction to the history and philosophy of science; 2. Publication of *Isis*; 3. Lectures.

Sarton, George. Twenty-third critical bibliography of the history and philosophy of science and of the history of civilization (to October 1927). *Isis*, 11, 151-272, 1928. ISIS

This bibliography contains, not 790 items as was said in the preface, but 1345, contributed by seventeen scholars.

Sarton, George. Twenty-fourth critical bibliography of the history and philosophy of science and of the history of civilization (to May 1928). *Isis*, 11, 404-568, 1928. ISIS

Containing about 887 items contributed by ten scholars.

Singer, Charles. From magic to science: Essays on the scientific twilight. 253 p. BONI and LIVERIGHT, New York, 1928. ISIS

Here is a beautifully printed and magnificently illustrated series of historical essays in SINGER's best style. Most of the material has been discussed by SINGER elsewhere but its popular presentation in such a splendid form will do much to increase appreciative interest in the history and philosophy of science. C. D. L.

Stromer v. Reichenbach, Ernst. Die Pflege der Naturwissenschaften in Nürnberg vom Ausgange des Mittelalters an bis zur Gegenwart. Festvortrag. *Abh. der naturhistorischen Gesellschaft zu Nürnberg*, Bd. 22, 233-40, 1927. ISIS

17. — ORGANIZATION OF SCIENCE.

(Internal organization is meant, see Isis, 1, 195. *For external (national or international) organization, see section* 55).

Blokh, Maks Abramovich. Scientific and technical research. Petrograd, 1920. R. S. F. S. R. The Scientific-technical Department of (V. S. N. KH.) The Scientific chemical-technical Publishers. 66 p. (in Russian) Petrograd, 1920. ISIS

18. — PHILOSOPHY OF SCIENCE.

Bridgman, Percy Williams. The new vision of science. *Harper's monthly magazine*, 443-451, New York, March 1929. ISIS

Very suggestive discussion of the readjustment made necessary by the development of the quantum theory and in particular by HEISENBERG's Principle of Uncertainty, a principle which the author believes « is fraught with the possibility of greater change in mental outlook than was ever packed into an equal number of words. » According to HEISENBERG's principle [1925-26], there are certain inherent limitations to the accuracy with which a physical situation can be described. We still assume that the future is determined if the present can be completely described, — but when such descriptions become *essentially* impossible, the future is essentially undetermined, and the law of cause and effect must be given up. « We have reached the point where knowledge must stop because of the nature of knowledge itself: beyond this point meaning ceases. » « The physicist thus finds himself in a world from which the bottom has dropped clean out; as he penetrates deeper and deeper it eludes him and fades away by the highly unsportsmanlike device of just becoming meaningless. No refinement of measurement will avail to carry him beyond the portals of this shadowy domain which he cannot even mention without logical inconsistency. A bound is thus forever set to the curiosity of the physicist. What is more, the mere existence of this bound means that he must give up his most cherished

convictions and faith. The world is not a world of reason, understandable by the intellect of man, but as we penetrate ever deeper, the very law of cause and effect, which we had thought to be a formula to which we could force God Himself to subscribe, ceases to have meaning. The world is not intrinsically reasonable or understandable; it acquires these properties in ever-increasing degree as we ascend from the realm of the very little to the realm of everyday things; here we may eventually hope for an understanding sufficiently good for all practical purposes, but no more.»

Dingler, Hugo. Das Experiment. Sein Wesen und seine Geschichte. VIII + 263 S. München, E. REINHARDT, 1928. ISIS

Eddington, Arthur Stanley. The nature of the physical world. (Gifford Lectures, 1927.) XIX + 361 p. Cambridge, University Press, 1928. ISIS

Reviewed by E. T. WHITTAKER, *Nature*, 123, 4-5, 1929.

Haldane, John Burdon Sanderson. Possible worlds and other essays. London, CHATTO and WINDUS, 1927. ISIS

Irsay, Stephen d'. Time-implied function: an historical aperçu. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 52-59, 1928. ISIS

Lillie, Ralph S. Physical indeterminism and vital action. *Science*, 66, 139-44, 1927. ISIS

Lillie, Ralph S. The scientific view of life. *Journal of philosophy*, 25, 589-606, 1928. ISIS

Mach, Ernst. Erkenntnis und Irrtum. Skizzen zur Psychologie der Forschung. 5. Aufl. XI + 476 S., 35 Abb. Leipzig, BARTH, 1926. ISIS

Reviewed by E. ZILSEL, *Deutsche Literaturzeitung*, 5, 2285-2288, 1928.
First edition, 1905.

Metz, André. Une nouvelle philosophie des sciences — le causalisme de M. Emile Meyerson. VI + 211 p. Paris, ALCAN, 1928. (Fr. 15).

Reviewed by HÉLÈNE METZGER, *Isis*, 11, 149, 1928. ISIS

Sullivan, John William Navin. The bases of modern sciences. X + 246 p. London, BENN, 1928. ISIS

Thomson, John Arthur. Introduction to science. (Home University Library.) Revised edition. 256 p. London, BUTTERWORTH, 1928.

First edition, 1911. ISIS

II. FORMAL SCIENCES.
(Knowledge of Forms).

19. — LOGIC AND THEORY OF KNOWLEDGE.

Keyser, Cassius Jackson. A fundamental background. *Teachers College Record*, 30, 432-46, 1929. ISIS

Lalande, André. Les fondements de l'induction et de l'expérimentation. VI + 288 p. Paris, BOIVIN et Cie, 1929. ISIS

L'auteur s'est proposé d'étudier dans ce volume, qui est la rédaction d'un cours fait à la Sorbonne, les différentes théories de l'induction et de l'expérimentation, d'une manière à la fois historique et technique. Il distingue, et traite en fait trois questions généralement confondues : la technique de l'induction, ses principes, son fondement, donnant au développement de la première, qui lui fait parcourir tout le cycle des rapports de la méthode expérimentale et de l'induction, une importance considérable, par rapport aux deux autres. 1. l'idée d'induction; 2. les origines de la méthode expérimentale; 3 et 4. l'induction baconienne : le point de départ; l'interprétation de la nature; 5. développement de l'hypothèse-conjecture (DESCARTES, HOBBES, BOYLE, LEIBNIZ, HOOKE); 6. les *regulae philosophandi*; 7. l'influence de l'idée newtonienne jusqu'à nos jours (XVIII[e] s., REID, AMPÈRE, COMTE, LITTRÉ, DUHEM, l'énergétisme) ; 8. la tradition de l'hypothèse de HUYGENS à WHEWELL; 9. la preuve formelle de la causalité : J. S. MILL; 10. la méthode expérimentale; 11. le fondement de l'induction; appendice : L. BRUNSCHVICG (*Isis* 5, 479-83), J. NICOD (*le problème de l'induction*, 1924), G. BACHELARD (*Isis*, 11, 522). L. G.

Russell, Bertrand. Méthode scientifique en philosophie. Trad. de l'anglais par PHILIPPE DEVAUX, avec une préface de MARCEL BARZIN. XXIV + 196 p. Paris, J. VRIN, 1929. ISIS

L'éditeur VRIN inaugure avec ce volume une « Collection de philosophie étrangère », dans laquelle il annonce, pour suivre celui-ci, une traduction de *The analysis of matter*, du même auteur et du même traducteur. Il a été longuement rendu compte (*Isis*, 3, 311-14) de l'édition originale de l'ouvrage ici traduit sur sa 3[e] édition. La préface de BARZIN est intéressante, à cause de la netteté avec laquelle elle fixe les traits essentiels de l'œuvre de RUSSELL. Malheureusement, le tout a sans doute été écrit très vite, et les épreuves ont été bien mal corrigées. L. G.

20. — MATHEMATICS.

Cajori, Florian. The early history of partial differential equations and of partial differentiation and integration. *American Mathematical Monthly*, 35, 459-67, 1928. ISIS

Contents : Partial processes in the writings of LEIBNIZ and his immediate followers; Argument over a differential equation of NEWTON involving three variables; Erroneous conceptions about the theory of fluxions; Partial diffe-

rentiation and partial integration in NEWTON; Partial differential equations in books on fluxions; EDWARD WARING.

Camp, C. C. Logarithms of large numbers. *American Mathematical Monthly*, 35, 547-51, 1928. ISIS

« BRIGGS' tables to fourteen places are extremely scarce and the Tables du Cadastre and those of SANG are still unpublished. The scarcity of VLACQ's and VEGA's tables has been compensated for by the new ten place tables of PETERS, but the demand for larger tables still exists. So great is this demand that the French and Germans are preparing tables to 14 and 15 decimals, respectively, while the British, not to be outdone, are preparing a standard table to 20 figures. When a table is available there remain two possible difficulties. One is the obvious inconvenience due to the size of the book and the other is the excessive amount of numerical work still necessary in computing the logarithm of a number with ten or more significant digits. It is with a view to overcoming these that the author became interested in comparing the various methods which have been employed in finding the logarithms of large numbers. »

Feldhaus, F. M. Rechenkästen. 9. *Euklid-Feldhaus-Beilage zur Maschinen-Buchhaltung*, Nr. 12, 33-36, 1 Abb., Dec. 1928. ISIS

Jackson, Dunham. The human significance of mathematics. *American Mathematical Monthly*, 35, 406-11, 1928. ISIS

Hoppe, Edmund (1854-1928). Zur Geschichte der Infinitesimalrechnung bis LEIBNIZ und NEWTON. *Jahresber. Deutsch. Math. Ver.*, 37, 148-87, 1928. ISIS

Löffler, E. Ziffern und Ziffernsysteme. 1. Teil. Die Zahlzeichen der alten Kulturvölker. Dritte Auflage. 54 p. Leipzig, TEUBNER, 1928. ISIS

« Die dritte Auflage des ersten Teils, die auf Wunsch des Verlags als photo-mechanischer Nachdruck der zweiten erscheint, ist sorgfältig durchgesehen und fast auf jeder Seite verbessert worden. »

Loria, Gino. Storia delle matematiche. Vol. 1. Antichità-medio evo-rinascimento. Con numerose figure nel testo. 487 p. Torino, Sten, 1929. ISIS

A history of mathematics written by GINO LORIA, who has been studying it and thinking of it for more than forty years, is bound to be interesting. He has not attempted to speak of everything, but rather to deal with the essential facts as completely as could be done within the prescribed compass. Vol. 1 is divided as follows : 1. Le antiche civiltà mediterranee; 2. La matematica greca in simbiosi con la filosofia; 3. egislatori della geometria; 4. L'autunno della geometria greca; 5. L'opera matematica degli astronomi e dei geodeti Greci; 6. L'arte del calcolo e la scienza del numero presso i Greci; 7. S. P. Q. R.; 8. Le matematiche in Europa

durante i secoli tenebrosi; 9. L'enigma cinese; 10. Ai piedi dell' Himalaya; 11. Il miracolo arabo; 12. La rinàscita in Italia : LEONARDO FIBONACCI; 13. La rinàscita al di là delle Alpi; 14. La geometria in aiuto della pittura; 15. Prime manifestazioni dell' algebra sincopata.

These titles need no explanation, except the tenth : « At the foot of the Himalayas ». This chapter is in reality devoted to Hindu mathematics ! If a chapter on Italian mathematics were called « at the foot of the Alps », that would be ridiculous enough, and yet how small Italy is as compared with India ! The main mathematical center of India was Ujjain, which is already at a tremendous distance from the Himalayas, and MAHÂVÎRA worked in Mysore, i.e., in S. India ! LORIA's geography seems to be a little hazy. To quote another instance, his chapter on the ancient Mediterranean civilizations includes an account of Assyria and Babylonia, as if the Mediterranean Sea were stretched as far as the Persian Gulf. On p. 25 he speaks of the law of HANKEL according to which people write their numbers in such a way that successive figures (as read in the direction of their writing) represent units of decreasing importance. According to that law Arabic numbers would be reversed as compared with ours, but it is *not* so ! LORIA would have been wiser to check the facts before stating that remarkable law ! G. S.

Ocagne, Maurice d'. Les archives nomographiques de l'École des Ponts et Chaussées. *Revue générale des sciences*, 39, 625, 1928. ISIS

Plimpton, George A. The history of elementary mathematics in the Plimpton Library. *Science*, 68, 390-95, 1928. ISIS

Vetter, Quido. Z minulosti proctarskych zakladu (The past of elementary arithmetic; in Czech.) *Zvlastni otisk z cyklu prednasek Poctarske Profily*. 16 p. Brno, 1928. ISIS

III. PHYSICAL SCIENCES.

(Knowledge of inorganic nature).

23. — ASTRONOMY.

Chamberlin, Thomas Chrowder (1843-1928). The two solar families : the sun's children. XXI + 311 p., 52 illus. Chicago, University Press, 1928. ISIS

Moreux, (Abbé) Th. Le Ciel et l'Univers. 4to, 626 p.; 595 fig. et 14 planches en couleurs. Paris, DOIN et Cie, 1928. ISIS

D'un style rapide, le directeur de l'observatoire de Bourges nous raconte les choses les plus marquantes touchant les découvertes qui se rapportent tant au système solaire qu'à l'univers sidéréal. Ceci augmente la valeur de ce manuel de luxe, dont le côté historique est aussi en évidence dans les choix des gravures, un bon nombre reproduisant des dessins du moyen-âge et divers instruments. Notons surtout le bas relief mexicain représentant le Zodiaque; le cylindre assyrien où Saturne figure comme anneau; les pre-

mières lunettes (téléscopiques) de GALILÉE, conservées à Florence. La médaille reproduite p. 54 figurera dans *Isis* : (medallic Illustrations, 7th. article.) c'est celle que l'Académie des Sciences frappa pour commémorer la découverte spectro-solaire de JANSSEN et LOCKYER. Enfin il s'y trouve d'admirables dessins ayant trait aux éclipses et aux planètes mineures, et d'autres qui appuyent une nouvelle théorie de l'auteur sur l'origine des planètes et de la diversité de l'inclinaison de leurs orbites. H. G. BÉVENOT.

Moulton, Forest Ray. The planetesimal hypothesis. *Science*, 68, 549-59, 1928. ISIS

Strauss, Heinz Artur. Der astrologische Gedanke in der deutschen Vergangenheit. 104 S., mit 93 Abb. aus der altdeutschen Buchillustration. München, OLDENBOURG, 1926. ISIS

24. — PHYSICS.

Allen, H. Stanley. The quantum and its interpretation. XIII + 274 p. London, METHUEN, 1928. ISIS

Reviewed by G. P. THOMSON, *Nature*, 121, 977-78, 1928.

Allen, H. Stanley. The quantum theory. *Nature*, 122, 887-94, 1928. ISIS

Bragg, Sir William. An introduction to crystal analysis. VII + 168 p., 8 pl. London, BELL, 1928. ISIS

Brockman, C. J. The origin of voltaic electricity : The contact vs. the chemical theory before the concept of E. M. F. was developed. *Journal of Chemical Education*, 5, 549-55, 1928. ISIS

Campbell, Norman R. An account of the principles of measurement and calculation. X + 293 p. London, LONGMANS, 1928. ISIS

Forschungen zur Geschichte der Optik. (Beilagehefte zur Zeitschrift für Instrumentenkunde). Herausgegeben unter Mitwirkung der Herren H. BOEGEHOLD, Jena, TH. H. COURT, London, F. P. LIESEGANG Düsseldorf, A. v. PFLUGK, Dresden, von dem Schriftleiter MORITZ v. ROHR in Jena. 1. Band, 1. Heft : Dezember 1928. 40 S. Berlin, JULIUS SPRINGER, 1928. ISIS

The articles published in this number will be registered in the next Critical Bibliography of *Isis*, each in the group to which it belongs. The same will be done for ulterior numbers if available to the Editor. G. S.

Jeans, Sir James. The physics of the universe. (The first Henry

Herbert Wills Memorial Lecture of the University of Bristol, delivered at the university on Oct. 30). *Nature*, 122, 689-700, 1928. ISIS

Kennelly, Arthur E. Vestiges of pre-metric weights and measures persisting in metric-system Europe, 1926-1927. XIII + 189 p. New York, MACMILLAN, 1928. ISIS

Lodge, Sir Oliver. Der Äther und die Wirklichkeit (Ether and reality) : eine Reihe von Vorträgen. Aus dem Englischen übersetzt von WALTHER RUMP. (*Die Wissenschaft*, Band 79.) VIII + 89 p. Braunschweig, FRIEDR. VIEWEG, 1928. ISIS

Rosenfeld, L. Le premier conflit entre la théorie ondulatoire et la théorie corpusculaire de la lumière. *Isis*, 11, 111-122, 1928. ISIS

1. La théorie des ondulations ; 2. La théorie corpusculaire ; 3. La controverse entre HUYGENS et NEWTON ; 4. Les causes de l'abandon de la théorie ondulatoire pendant le XVIII[e] siècle.

Thomson, Sir J. J. Beyond the electron : a lecture given at Girton College on March 3, 1928. 44 p. Cambridge, University Press, 1928. ISIS

25 — CHEMISTRY, PHYSICO-CHEMISTRY, INDUSTRIAL CHEMISTRY.

Browne, Charles Albert. EDGAR FAHS SMITH (1854-1928). *Isis*, 11, 375-84, portrait, 1928. ISIS

Browne, C. A. An old colonial manuscript volume relating to alchemy. *Journal of Chemical Education*, 5, n° 12, December, 1928. 8 p., 3 pl. ISIS

« Among the many colonial documents relating to the early history of alchemy in America, which are preserved in the library of the Massachusetts Historical Society in Boston, there is an ancient manuscript volume of folio size written in various handwritings upon paper which is now crumbling to pieces with age. The work comprises a collection of various English and Latin tracts upon alchemy, many of them in verse, which belonged originally JOHN WINTHROP, Jr., the first Governor of Connecticut. » « This antique volume, which from indications was transcribed some time in the second half of the sixteenth century before printed books upon alchemy were at all common, might be called almost the Magna Charta of chemistry in America. It was brought to this country when most of the land within the present borders of the United States was an unsettled wilderness and its pages, annotated by the early patrons of chemistry in New England, form a visible connecting link between present-day chemistry of America and medieval alchemy of Europe. » On JOHN WINTHROP, jr. (1606-76) see the author's study in *Isis*, 11, 325-42, 2 pl., 1928. Mr. G. W. ROBINSON,

who is preparing a new edition of the WINTHROP papers, tells me that this Ms. bears notes written by JOHN's grandfather, ADAM WINTHROP (1548-1623)
G. S.

Caley, Earle R. Mercury and its compounds in ancient times. *Journal of Chemical Education*, 5, 419-24, 1928. ISIS

Ipat'ev, Vladimir Nikolaevich and Blokh, Maks Abramovich. Catalytical phenomena in nature. Petrograd, Scientific chemical technical Publishers (Nauchnoe Khimiko-Tekhnickeskoe izdatel'stvo), 1922. At head of title: R. S. F. S. R. The Scientific Technical department of (V. S. N. KH.) the Supreme Council of National Economy. 90 p. (in Russian) Petrograd, 1922. ISIS

Lippmann, Edmund O. von. Beitrag zur Geschichte der Katalyse. 2 p. Reprint from *Chemiker-Zeitung*, Nr. 2, 1929. ISIS

Tracing the history of catalysis back to APULEIUS through ST. AUGUSTINE, BARTHOLOMEW the Englishman, and ALBERT THE GREAT! G. S.

Luedy, F., jr. Alchemistische und chemische Zeichen. 57 p., 127 pl. Gesellschaft für Geschichte der Pharmazie, 1928. ISIS

This brochure constitutes the fourth and last « Veröffentlichung » for the association year 1927-28 of the newly organized German Society for the History of Pharmacy. Like the other three it reflects credit, not only upon its author, but upon the society as well.

The new theories concerning atomic structure have rendered more probable, theoretically at least, the « transmutation » of one element into another. This has caused some people to imagine that, after all, the alchemists possessed the secret knowledge of transmuting baser metals into gold. With this notion there has gone hand in hand a renewed interest in alchemical literature. For the interpretation of this literature it is necessary to understand the secret language of its author.

Such, however, is not the interest of the author of the new treatise on alchemical and chemical symbols. As a pharmacist, his interest lay rather in providing a systematic key to the symbols extensively used in the medical and pharmaceutical literature of the past. One might as well accuse modern physicians of secrecy when they use Latin terminology in writing prescriptions as to accuse all physicians of the past when they used symbols in writing prescriptions, or all pharmacists of the same kind of selfishness when they used these same symbols as labels on their jars or pots.

The author does not even pretend to supply the only system but merely a system. The one hundred and twenty-seven plates, each consisting of two columns of symbols, are preceeded by a plate of four columns of simple forms with references to the plates where these forms with all of their modifications are arranged, from the simplest to the most complex. Given a certain basal form, be it a picture form or a letter of the alphabet, the reader may thus trace it through all of its modifications and learn their different meanings.

In the text the author traces the literature consulted and illustrates by means of photographic reproductions how a given manuscript or text has contributed to his collection which, as already pointed out, he has worked into a system. The text is followed by an alphabetical index of Latin terms found in the tables. E. K.

Nakaseko, Rokuro. History of world chemistry (in the Japanese language). v + 571 p., photogravure pl. Kaniya Book Store, Kyoto, 1927. ISIS

Contains chapters on Japanese and Chinese alchemy. Reviewed by MUCCIOLI in *Archivio di Storia della Scienza*, 9, 379-382, 1928. T. L. D.

Quill, Lawrence L. Illinium — element number 61. *Journal of Chemical Education*, 5, 561-68, 1928. ISIS

Schreiner, Oswald. History of the art of distillation and of distilling apparatus. 59 p., 65 fig. Milwaukee, Pharmaceutical Review Publishing C°., 1901. ISIS

Stieglitz, Julius (*editor*). Chemistry in medicine. A cooperative treatise intended to give examples of progress made in medicine with the aid of chemistry. XXI + 757 p., 23 ills. New York, The Chemical Foundation, 1928. ISIS

Some years ago, Mr. and Mrs. FRANCIS P. GARVAN of New York City and Roslyn, Long Island, lost a beloved child, PATRICIA. In their great sorrow they found, not discouragement, but on the contrary the inspiration of a great purpose. They resolved to spend a part of their fortune in the promotion of chemical and medical knowledge, and created the Chemical Foundation of New York. The present volume is one of the fruits of their generous undertaking. It has been written by a number of leading experts, each of whom explains the chemical facts best known to him bearing on physiology, heredity, and therapeutics. It is a trustworthy guide, an excellent reference book. Some of the articles contain brief historical information. G. S.

Su-Hien Ting. A history of chemistry for general reference (in the Chinese language). National University of Peking, 1925. 420 p. ISIS

A good general history of chemistry for the use of students. It contains nothing on Chinese alchemy, but is significant evidence of a growing interest in the history of chemistry. T. L. D.

26. — TECHNOLOGY.

(*For mining, see* 32 *geology; for industrial chemistry*, 25. *chemistry. See also arts and crafts under* 45).

Feldhaus, Franz Maria. Kulturgeschichte der Technik. 2 vols.

Vol. 1, 154 p., 60 fig. Vol. 2, 209 p., 47 fig. (*Mathematisch-Naturwissenschaftlich-Technische Bücherei*, vols. 20-21). Berlin, OTTO SALLE, 1928 (Mk. 11). ISIS

We have already spoken of the excellent collection edited by OTTO SALLE in Berlin, apropos of WIELEITNER's Mathematische Quellenbücher (4 vols., *Isis*, 11, 240; 12, 413). The two recent additions to it, containing a long series of stories illustrating the progress of technology, need hardly be praised, since they were written by the leading historian of technology of our time, FELDHAUS. On the other hand, it is out of the question to summarize them since they intend to cover the whole field from prehistoric days to the end of the nineteenth century. G. S.

Hendrichs, Franz. Die Schleifkotten an der Wupper. 96 p., illustrated. Aus der Geschichte der Solinger Industrie I. Verein für Technik und Industrie, Solingen, 1922. ISIS

Hendrichs, Franz. Von der Handschmiede zur Schlägerei: Der Tischmesserschmied. Aus der Geschichte der Solinger Industrie, II. 72 p., illustrated, 1922. ISIS

These two monographs give an account of the old hand crafts of the Solingen cutlery industry at the moment of being transformed by machine production. An admirable example of local historical enthusiasm and research. C. H. D.

Hopkins, Albert A. The lure of the lock. A short treatise on locks to elucidate the JOHN M. MOSSMAN Collection of locks in the Museum of The General Society of Mechanics and Tradesmen in the City of New York, including some of the « MOSSMAN Papers ». VI + 246 p. 500 illus., New York, General Society of Mechanics and Tradesmen, 1928. ISIS

Laufer, Berthold. The prehistory of aviation. (*Field Museum of Natural History*, publication 253, anthropological series, volume 18, n° 1.) 96 p., 12 pl. Chicago, 1928. ISIS

Contents: The romance of flying in ancient China; Kites as precursors of aeroplanes; The dawn of airships in ancient India; From Babylon and Persia to the Greeks and the Arabs; The air mail of ancient times. This paper contains a good many stories derived from Chinese literature which were hitherto unavailable to western readers. G. S.

Laufer, Berthold. The prehistory of television. *Scientific Monthly*, 27, 455-59, 1928. ISIS

IV. BIOLOGICAL SCIENCES
(Knowledge of organic nature).

27. — BIOLOGY (*Generalities*, « *Natural History* »).

Lillie, Ralph S. The nature of the vitalistic dilemma. *Journal of philosophy*, 23, 673-82, 1926. ISIS

Mason, Frances. (*editor*). Creation by evolution. A consensus of presentday knowledge as set forth by leading authorities in non-technical language that all may understand. Foreword by HENRY FAIRFIELD OSBORN. Introduction by Sir CHARLES SCOTT SHERRINGTON. New York, MACMILLAN. 1928. ISIS

Meyer, Adolf. Das Wesen der idealistischen Biologie und ihre Beziehungen zur modernen Biologie. *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 149-78, 1 Abb., 1928. ISIS

Meyer, Adolf. Das Wesen der antiken Naturwissenschaft mit besonderer Berücksichtigung des Aristotelismus in der modernen Biologie. *Archiv für Geschichte der Medizin*, 22, 1-23, 1 fig., 1929. ISIS

Montalenti, Giuseppe. Storia delle teorie dell'eredità. *Rassegna di studi sessuali, demografia ed eugenica*, 8, 112-25, 1928. ISIS

29. — ZOOLOGY.

Maeterlinck, Maurice. Das Leben der Termiten. (La vie des termites.) Uebertragen von KÄTHE ILLICH. 196 p. Stuttgart, Deutsch Verlags-Anstalt, 1928. ISIS

Moll, Friedrich. Die Bohrmuschel (*Teredo navalis*) in der älteren Literatur. *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 123-49, 7 Abb., 1928. ISIS

Uvarov, B. P. Locusts and grasshoppers: a handbook for their study and control. XIII + 352 p., 118 illus., 8 pl. London, Imperial Bureau of Entomology, 1928. ISIS

Reviewed by L. C. HOWARD, *Science*, 69, 224, 1929. « The original edition of this important book was published in the Russian language at Moscow by the Central Cotton Committee in 1927; but this English edition differs essentially, and is much fuller and of much broader interest. »

Wheeler, William Morton. The social insects: their origin and

evolution. (International library of psychology, philosophy, and scientific method.) XVII + 378 p., 48 pl. London, KEGAN PAUL, 1928. ISIS

First published in French, 1926; see *Isis*, 10, 279.

V. SCIENCES OF THE EARTH

(implying knowledge of both organic and inorganic nature).

30. — GEODESY.

Mathieson, John. Geodesy: a brief historical sketch. *Scottish Geographical Magazine*, 42, 328-47, 1926. ISIS

Beginning with primitive conceptions, the author traces the history of geodetic methods and triangulation down to the twentieth century. Interesting data are given on various early measurements of arcs of meridian. J. K. W.

31. — GEOGRAPHY AND OCEANOGRAPHY.

Adams, Frank Dawson. The origin of springs and rivers: an historical review. *Fennia*, 50, n° 1, 16 p., 1 pl., 1928. ISIS

Brief outline of theories that have been held regarding the origin of springs and rivers from the time of PLATO until the correct explanation was given by ANTONIO VALLISNIERI of Padua in an address published in 1715 under the title Intorno all'origine delle fontane. J. K. W.

Berg, L. S. Istoria geograficheskago oznakomleniya s Yakutskim Kraem (History of the geographical acquaintance with the Yakutsk region) p. 1-38 in « *Yakutiya* » — Sbornik Statei (collection of articles), published by the Academy of Science, Leningrad, 1927. ISIS

Reviewed by N. TRANSEHE, *Isis*, 11, 398-99, 1928.

British Museum. Six early printed maps selected from those exhibited at the British Museum on the occasion of the International Geographical Congress, 1928. 4 p., 6 folded pl. London, Oxford University Press, 1928. ISIS

Reproductions of: 1. ERHARD ETZLAUB's « map of central Europe showing the chief roads leading to Rome, and probably the earliest printed map on which roads are marked (c. 1492); 2. a map dated « Romae 1546 » possibly by GEORGE LILY and « believed to be the first printed map of the British Isles apart from those in PTOLEMY's Atlas »; 3. a map of the world on an « unusual projection which was devised by JOHN BLAGRAVE, an Oxford mathematician » (London, 1596); 4. « Nova Francia » by GABRIEL TATTON, c. 1610; 5. WILLIAM BAFFIN's map of « East India » (London, 1619), « the earliest English map of the Mogul territories »; 6. N. J. VISSCHER's « Novi Belgii novaeque Angliae nec non partis Virginiae tabula multis in locis emen-

data a N. J. VISSCHERO, showing « the early European settlements in North America, extending from Maine to Virginia » (Amsterdam, c. 1655).
J. K. W.

Caddeo, Rinaldo. Le navigazioni atlantiche di ALVISE DA CÀ DA MOSTO, ANTONIOTTO USODIMARE e NICCOLOSO DA RECCO. (*Viaggi e scoperte di navigatori ed esploratori italiani*, I). 340 p., pls., maps, Milan, ALPES, 1928. ISIS

The first of an attractive series of texts being issued under the auspices of a group of distinguished Italian specialists in the history of geography and exploration. Each volume contains scholarly introductions, appendixes, and bibliographical data, and is tastefully illustrated. See also PAOLO GIUDICI: Itinerario di LUDOVICO DE VARTHEMA bolognese nello Egypto, nella Surria, nella Arabia Deserta et Felice, nella Persia, nella India et nella Etiopia; la fede, el vivere et costumi de tutte le prefate provincie; CAMILLO MANFRONI: Relazione del primo viaggio intorno al mondo di ANTONIO PIGAFETTA seguita del roteiro d'un pilota genovese; RANIERI ALLULLI: Il milione di MARCO POLO; GIORGIO PULLÈ: Viaggio a' Tartari di frate GIOVANNI DA PIAN DEL CARPINE (Historia Mongalorum); MARIO LONGHENA: Viaggi in Persia, India e Giava di NICOLO DE' CONTI, GIROLAMO ADORNO e GIROLAMO DA SANTO STEFANO. J. K. W.

Colin, Elicio (*editor*). XXXVII[e] Bibliographie géographique, 1927. Publiée avec la collaboration de l'American Geographical Society, du Comitato Geografico Nazionale Italiano, de la Royal Geographical Society (London), de la Société de Géographie d'Egypte et avec le concours de la Fédération des Sociétés Françaises de Sciences Naturelles. (Association de géographes français). 602 p. Paris, Librairie ARMAND COLIN, 1928. ISIS

For volume 36 of this excellent collection, see *Isis*, 11, 538. The most interesting parts to our readers, « Histoire de la géographie » and « Géographie historique », contain respectively 106 and 93 notes, out of a grand total of nearly 3000. G. S.

Errera, Carlo. L'epoca delle grandi scoperte geografiche. Terza edizione rinnovata ed accresciuta con 22 carte, schizzi e ritratti. XXVIII + 505 p., 22 pl. (incl. maps). Milan, ULRICO HOEPLI, 1926. ISIS

The first edition of this admirable sketch of the outstanding achievements of the Age of Discovery appeared in 1901. The third edition has been brought up to date in points of detail. J. K. W.

Fordham, Sir Herbert George. Hand-list of catalogues and works of reference relating to carto-bibliography and kindred subjects for Great Britain and Ireland 1720 to 1927. 25 p. Cambridge, University Press, 1928. ISIS

nety-one titles chronologically arranged. J. K. W.

(Geography, Congress). Atti del IX Congresso Geografico Italiano, tenuto in Genova dal 22 al 30 Aprile 1924. 3 vols. Genoa, Stabilimenti italiani arti grafiche, 1925-1927. ISIS

Forty-eight « Communicazioni » in the fields of historical geography and history of geography are printed in the second volume. The titles of some of the more significant papers on the history of geography follow: 72. Gli Iperborei in ERODOTO e PINDARO, by LUIGI CERRATO; 73. L'autore del poemetto latino Aetna e un passo controverso di SENECA, by ACHILLE BELTRAMI; 74. PITEA DI MASSILIA e la sua « Tule », by GASTON E. BROCHE; 75. Di un probabile influsso di PLINIO SECONDO sulla configurazione dell' Italia dataci dall' ORTELIO e da altri cartografi del cinquecento, by ADOLFO BASSI; 76. Il più antico portolano medioevale del Mediterraneo, by B. R. MOTZO; 77. I manoscritti dell' opera di GIOVANNI DA UZZANO, by B. R. MOTZO; 78. L'elemento geografico nel « Columbus » di UBERTINO CARRARA (1715), by MARIO SEGRE; 80. Quale posto spetta a G. J. HERDER nella storia della concezione antropogeografica, by ALGISA RENSI; 82. Raccolta di documenti per le carte storiche d'Italia, by G. LODOVICO BERTOLINI; 83. Documenti riferentisi all'Italia nell' Archivio Storico della Camera di Commercio di Marsiglia, by GASTON E. BROCHE; 87. Per lo studio della letteratura geografica nel Rinascimento, by GUIDO VITALETTI; 88. L'Atlante di BARTOLOMEO OLIVES (1561), by PAOLO DE GRAZIA; 89. L'Italia secondo un atlantino di tipo orteliano, by A. BASSI; 92. Le pitture geografiche murali nel Palazzo Vescovile di Aosta (with 2 photographs), by P. L. MARINI; 93. Le pitture geografiche nel Palazzo Chigi di Castelfusano (Roma) by ROBERTO ALMAGIÀ; 94. La pittura della Liguria nella Galleria Vaticana, by ROBERTO ALMAGIÀ; 110. Contributo geografico di un Cappuccino (GUGLIEMO MASSAIA), by P. FULGENZIO PROF. TARCA; 111. Un bel nome siciliano nella storia della geografia; G. B. NICOLOSI, by F. S. GIARDINA; 112. FERDINANDO GABOTTO e la geografia, by GIUSEPPE ROSSO; 113. L'opera geografica di ARTURO ISSEL, by G. ROSSO; 114. L'edizione del testo definitivo di MARCO POLO, by G. VACCA. The third volume includes the text of an address by ROBERTO ALMAGIÀ in commemoration of MARCO POLO, together with a catalogue of an exhibit of early maps of Liguria accompanied by interesting reproductions of some of the more striking items.

J. K. W.

Ghisleri, A. La Libia nella storia e nei viaggiatori dai tempi Omerici all'occupazione italiana. VIII + 171 p., front., pl., maps. Torino, G. B. PARAVIA, 1928. ISIS

Iorga. N. Une vingtaine de voyageurs dans l'Orient européen. *Revue historique du sud-est Européen*, 5, 288-354, 1928. ISIS

Short notes on thirty-two travelers in eastern Europe between 1530 and 1863 not dealt with in the author's Voyageurs français dans l'Orient européen, published recently. These are all of nationalities other than French.

J. K W.

Ispizúa, Segundo de. Historia de la geografía y de la cosmografia en las edades antígua y medía con relación a los grandes descubrímientos maritimos realizados en los siglos XV y XVI por Españoles

y Portugueses. Obra que se escribe por encargo de la Junta de Cultura de la Excma. Diputación de Vizcaya, y por designación, a petición de ella, de la Real Academia de la Historia, para enaltecer a JUAN SEBASTIÁN DE ELCANO y a los que con él dieron los primeros la vuelta al mundo, ilustrada con numerosos mapas históricos, algunos de ellos reproducidos por primera vez de ediciones rarisimas. 2 vols. Madrid, Gráficas Reunidas, 1922; « Mateu », 1926. ISIS

An elaborate, illustrated publication, of which the second volume appeared posthumously. Texts of ancient and medieval authorities are extensively quoted in translation and detailed bibliographical references given to early editions and to secondary works, particularly of French, Spanish, and Italian scholars. J. K. W.

Moreno, Adrián Ruiz. La evolución de la cartografía argentina; su importancia actual y futura. *Gaea*, nº 3, 165-82, 1925. ISIS

Mori, Attilio. L'esplorazione geografica della Libia. Rassegna storica e bibliografica. (Governo della Cirenaica, Ufficio Studi : Rapporti e Monografie Coloniale, Serie 2ª, Nº 5.) 112 p., fold. map. Florence, Tipografia MARIANO RICCI, 1927. ISIS

Historical sketch of explorations in Lybia since the close of the 18th century, with full bibliographical details. J. K. W.

Olszewicz, Boleslaw. Polska kartografja wojskowa (Zarys historyczny). La cartographie militaire polonaise (Essai historique). (Wojskowy Instytut Naukowo-Wydawniczy. Institut des Sciences Militaires.) 199 + LXXX p., maps. Warsaw, Glówna Ksiegarnia Wojskowa, 1921. ISIS

History of Polish military cartography from the fifteenth century to the present time, with a twelve-page résumé in French. J. K. W.

Partsch, Joseph (1851-1925). Aus fünfzig Jahren verlorene Schriften : mit einer Biographie und vollständiger Bibliographie; herausgegeben von H. WALDBAUR. 184 p., front., 3 pl., 2 tables, Breslau, FERDINAND HIRT, 1927. ISIS

Includes a brief biography of the geographer PARTSCH, reprints of some of his publications selected so as to reveal his many-sided scientific interests, and an extended bibliography of his monographs, lesser publications, addresses, and book reviews. PARTSCH's contributions to the history of geography, particularly of the classical period, were notable. The present volume includes among other papers : Geologie und Mythologie in Kleinasien, Die Berbern in der Dichtung des CORIPPUS, and Die geographische Arbeit des XIX Jahrhunderts, published respectively in 1888, 1896, and 1899. J. K. W.

Pellegrinaggi ed ospizi nell'antichità e nel medioevo con darticolare

accenno allo « Itinerarium Hierosolimitanum. » *L'Universo*, 8, 1039-57, 1927. ISIS

Scott, Ernest. The maritime exploration of western Australia, with especial reference to the voyages of DAMPIER and D'ENTRECASTEAUX. Report of the Eighteenth Meeting of the Australasian Association for the Advancement of Science, 18, 402-16, 1928. ISIS

« Two fresh chapters in the history of exploration in this region, one which throws some additional light upon DAMPIER's failure at the end of the 17th century, and the second which reveals why D'ENTRECASTEAUX's search for news of LAPÉROUSE ended in disaster at the end of the 18 th. » J. K. W.

Stolz, Otto. Anschauung und Kenntnis der Hochgebirge Tirols vor dem Erwachen des Alpinismus. *Zeitschrift des Deutschen und Österreichischen Alpenvereins*, 58, 8-36, 1927; 59, 14-66, 1928. ISIS

Covers the medieval period and following centuries to about 1800 and deals with the following topics : terms and phrases used to describe the topographic features of the high mountains, speculations regarding their altitudes, attempts at subdividing the Tyrolese Alps into groups, impressions of mountain landscape, opinions regarding the origin and theological significance of the mountains, the representation of the mountains on maps and pictures, descriptions of and theories regarding glaciers and avalanches, visits to the high mountains for economic and commercial reasons, visits prompted by interest in the mountains for their own sake, mountain ascents and journeys, equipment of mountaineers, the naming of individual peaks. J. K. W.

Taylor, E. G. R. Pactolus : River of gold. *The Scottish Geographical Magazine*, 44, 129-44, 1928. ISIS

A study of « various... obscure West African journeys (in ancient and medieval times), supposing the outstanding attraction of West Africa throughout the ages to have been the gold of the Sudan. » J. K. W.

Tiberghien, Albert. Liste sommaire des documents cartographiques exposés, en novembre 1926, au Palais d'Egmont, à l'occasion du Cinquantenaire de la Société Royale Belge de Géographie, à Bruxelles. *Bull. de la société royale belge de géographie*, 50, 322-39, Bruxelles, 1926. ISIS

Zeitschrift der Gesellschaft für Erdkunde zu Berlin. Sonderband zur Hundertjahrfeier 1828-1928. Herausgegeben von ALBRECHT HAUSHOFER. 551 S., 25 Taf., 51 Abbild., 5 Karten. Berlin, Selbstverlag der Gesellschaft, 1928. ISIS

Reviewed by H. HASSINGER, *Deutsche Literaturzeitung*, 6, 190-93, 1929.

32. — GEOLOGY, MINERALOGY, PALAEONTOLOGY, MINING.

(For palaeobotany, palaeozoology and palaeoanthropology, see respectively 28. *botany*, 29. *zoology and* 39. *prehistory).*

Adams, Frank Dawson. The origin of springs and rivers. An historical review. 16 p., 2 pl. (*Fennia* 50, n° 1) Helsingfors, 1928. ISIS

Elaborate survey from ancient times down to ANTONIO VALLISNIERI, who discovered and made known, in 1715, the true explanation of the origin of springs and rivers. How is it that it took so long to make this discovery? Says the author: « There were two chief reasons — first the failure from the time of ARISTOTLE down to the beginning of the eighteenth century to recognize that the rainfall upon the earth's surface was sufficient and much more than sufficient to provide the amount of water which is carried off by the rivers of the world. No amount of ingenious speculation could determine this — it had to be ascertained by careful and accurate measurements and until mankind had adopted the « Novum Organum » this important and basal fact remained unrecognized. A second reason was the acceptance of certain biblical texts as supplying definite and authoritative information concerning certain geological phenomena and establishing the correctness of certain speculations concerning them. » See another paper by the same author, classified under XVII (2) C. G. S.

Antevs, Ernst. The last glaciation: with special reference to the ice retreat in north-eastern North America. (*American Geographical Society Research Series*, N° 17; Shaler Memorial Series.) x + 292 p., 9 pl. New York, American Geographical Society, 1928. ISIS

Reviewed by C. E. P. BROOKS, *Nature*, 122, 761, 1928.

Davis, William Morris. The coral reef problem. (*American Geographical Society, special publication n°* 9) Shaler Memorial Series. VI + 596 p., 227 fig. New York, American Geographical Society, 1928 (six dollars). ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 399-401, 1928.

Lacroix, Alfred. Notice historique sur le troisième fauteuil de la section de minéralogie. 86 p. (Académie des Sciences, séance publique annuelle du lundi 17 décembre 1928). Paris, Gauthier-Villars, 1928. ISIS

Wegener, Alfred. Die Entstehung der Kontinente und Ozeane. (*Die Wissenschaft*, herausgegeben von WILHELM WESTPHAL, Band 66.) Vierte umgearbeitete Auflage. x + 231 p. Braunschweig, FRIEDR. VIEWEG, 1929. ISIS

VI. ANTHROPOLOGICAL AND HISTORICAL SCIENCES.
(Knowledge of man, past and present).

34. — ANATOMY.

Fauré-Fremiet, E. La chaire d'embryogénie comparée du Collège de France et l'évolution des sciences du développement. *Revue générale des sciences*, 40, 37-45, 1929. ISIS

Levinson, A. History of cerebrospinal fluid. Festschrift MAX NEUBURGER gewidmet, 225-30, Wien, 1928. ISIS

Nuyens, B. W. Th. Het ontleedkundig onderwijs en de geschilderde anatomische lessen van het Chirurgijns Gilde te Amsterdam, in de jaren 1550 tot 1798. In het jaarverslag 1928 van het Koninklijk Oudheidkundig Genootschap te Amsterdam en als overdruk verschenen bij P. N. VAN KAMPEN en Zoon, te Amsterdam, 1928. ISIS

Reviewed by F. M. G. DE FEYFER, *Bijdragen tot de geschiedenis der geneeskunde*, 8, 344-45, 1928.

36. — PHYSIOLOGY (*human and comparative*).

Berczeller, L. Zur Geschichte der Ernährungsforschung. Festschrift MAX NEUBURGER gewidmet, 38-40, Wien, 1928. ISIS

Henderson, Lawrence Joseph. Blood : a study in general physiology. (Yale University : Mrs. Hepsa Ely Silliman Memorial Lectures.) XIX + 397 p. New Haven, Conn., Yale University Press, 1928 ISIS

Henning, Hans. Der Geruch. Ein Handbuch für die Gebiete der Psychologie, Physiologie, Zoologie, Botanik, Chemie, Physik, Neurologie, Ethnologie, Sprachwissenschaft, Literatur, Ästhetik und Kulturgeschichte. Zweite, gänzlich umgearbeitete und vermehrte Auflage, mit 14 Abbildungen im Text. 434 S. Leipzig, BARTH, 1924. ISIS

The first chapter deals in the most condensed manner with the history of smell and of perfumes from the earliest times down to our own (20 p.). There are many historical references in other parts of the book which is truly of encyclopeadic scope. G. S.

Irsay, Stephen d'. Der philosophische Hintergrund der Nervenphysiologie im 17. und 18. Jahrhundert. Sonderabdruck aus *Archiv für Geschichte der Medizin*, 20, 181-97, 1928. ISIS

(Journal of Physiology). Author index to volumes 1 to 60. Issued

by the Physiological Society and published as a Supplement to The *Journal of Physiology*, June 1928. II + 235 p. London, Cambridge University Press, 1928. ISIS

Keith, Sir **Arthur**. The engines of the human body: Being the substance of Christmas lectures given at the Royal Institution of Great Britain, Christmas 1916-1917. Third impression, revised and enlarged. XV + 343 p. Philadelphia, J. B. LIPPINCOTT, 1927. ISIS

First appearing in December 1919, this popular treatise has been frequently revised and reprinted. It contains much interesting historical material presented in a most attractive manner calculated to win the attention of the intelligent public. C. D. L.

Koopman, J. Bijdragen tot de geschiedenis van de endocrinologie. Hersenaanhangsel en hersenbasis. *Bijdragen tot de geschiedenis der geneeskunde*, 8, 333-41, 1928. ISIS

Lauber, H. Zur Geschichte der Untersuchung des Gesichtsfeldes. Festschrift MAX NEUBURGER gewidmet, 219-24, Wien, 1928. ISIS

37. — PSYCHOLOGY (*human and comparative*).

Le Roy, Edouard. L'exigence idéaliste et le fait de l'évolution. XVIII + 272 p. Paris, BOIVIN et Cie, 1927. ISIS

« Ce volume contient la reproduction pure et simple de leçons professées au Collège de France en 1925 et 1926 »; il en prépare un second sur les origines humaines et l'évolution de l'intelligence (*v. infra*), et porte avant tout sur le fait général de l'évolution biologique, analysé dans le dessin de découvrir ce qu'il apprend au philosophe, et ce que le philosophe peut en apercevoir au delà du simple phénomène. « Une formule aujourd'hui célèbre exprime en deux mots l'idée dont je me suis fait, dans ce cours, le défenseur : évolution créatrice. Que signifie, que vaut cette idée? J'essaye de la définir et de la justifier, contre tant de méprises qui l'ont accueillie, par un commentaire emprunté surtout aux données de la science. Montrer comment et pourquoi le mouvement évolutif est plus que le résultat de mécanisme, plus même que simple « explication de puissance », qu'il est comparable à une démarche, à un effort d'invention, unique moyen de vaincre l'improbabilité inhérente aux combinaisons vitales, c'est le double but que je vise. On voit l'intime rapport au problème de la liberté, dont je recherche en somme les racines biologiques, par un chemin relié de près à la dialectique idéaliste, puisqu'il mène à travers la préhistoire de la pensée ». L. G.

Le Roy, Edouard. Les origines humaines et l'évolution de l'intelligence. 388 p. Paris, BOIVIN et Cie, 1928. ISIS

Cet ouvrage fait suite à celui qu'a publié ED. LE ROY sur l'exigence idéaliste et le fait de l'évolution (*V. Supra*). Il continue la même recherche. « L'ob-

jet propre en sera suffisamment défini, dit l'auteur dans son avant-propos, si j'indique les divisions majeures du plan adopté : 1. le problème biologique de l'homme (pp. 1-57); 2. les principes d'une solution (58-129); 3. les origines humaines (130-208); 4. l'évolution de l'intelligence (209-312); 5. conclusions (313-71). Le titre du volume indique que les troisième et quatrième parties en marquent le centre; les deux premières introduisent la question, en la rattachant aux thèses du volume antérieur; la dernière prépare de futurs développements » que l'auteur annonce sous le titre : les époques de l'intelligence. L. G.

Marie, A. La psychanalyse et les nouvelles méthodes d'investigation de l'inconscient. Étude des problèmes de l'inconscient au point de vue du déterminisme psychologique et de la psychanalyse. 274 p. *Bibl. de philo. contempor.* Paris, E. FLAMMARION, 1928. ISIS

Cette étude de MARIE, une des plus objectives qui aient été écrites en France sur la psychanalyse, où l'on sent la sincérité du clinicien qui domine son sujet, et aussi la vaste culture de l'homme qui peut ne pas s'interdire de pénétrer dans le domaine de l'art et de la littérature, est divisée en deux parties : exposé du freudisme (pp. 11-114), et critique du freudisme (115-268). « Les six premiers chapitres exposent successivement : 1. comment la psychanalyse entend explorer l'inconscient; 2. la métaphysique des rêves; 3. la psychologie du rêveur; vient ensuite : 4. le freudisme en pathologie mentale, avec 5. la libido, comme base fondamentale des psychonévroses; 6. la cure psychanalytique de ces dernières. La seconde partie comprend : 1. les critiques et objections faites au freudisme; 2. l'insuffisance neuropsychiatrique de la doctrine; 3. les passages insensibles des phénomènes inconscients au conscient par le subconscient; 4. l'influence du freudisme sur la littérature et l'art : 5. sur la société (histoire et préhistoire, morale, hygiène et prophylaxie mentale ainsi que pédagogie); 6. la nécessité de contrôler les déductions de la psychanalyse par l'étude objective du mécanisme neuro-psychique (réflexologie) ». À FREUD, novateur génial, MARIE rend un très juste hommage et ne craint pas de le comparer à CHARCOT, à DARWIN, à PASTEUR, dont les systèmes n'ont pas survécu intégralement, mais ont eu sur l'évolution de la science l'influence que l'on sait. « L'édifice théorique de la psychanalyse, dit FREUD, n'est en réalité qu'une superstructure que nous devons asseoir sur sa base organique »; cette base organique qui manquait, MARIE croit la voir dans les travaux de W. M. BETCHEREW (1854-1928) (Psychologie objective, 1913; Principes de réflexologie humaine, en russe, 1918, 3e éd. 1926, trad. allemande 1926) qui rattache les phénomènes de la conscience au mécanisme des réflexes cérébraux. L. G.

39. — PREHISTORY.

Bünge, Peter. Eine kippsichere Flasche aus der Hallstatt-Zeit. *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 223-24, 3 Abb., 1928. ISIS

Burkitt, Miles Crawford. South Africa's past in stone and paint. XIV + 183 p., 9 pl. Cambridge, University Press, 1928. ISIS

Reviewed by A. C. HADDON, *Nature*, 122, 918, 1928.

Hall, Harry Reginald. The civilization of Greece in the Bronze Age. (The Rhind Lectures, 1923). XXXII + 302 p. London, METHUEN, 1928. ISIS

Moodie, Roy L. The paleopathology of Patagonia. *Annals of Medical History*, 10, 314-15, 1928. ISIS

40. — ETHNOLOGY.

(*Primitive and popular science*).

Bodding, Rev. P. O. Studies in Santal medicine and connected folklore. Part 2 : Santal medicine. *Memoirs of the Asiatic Society of Bengal.* vol. 10, N° 2 : p. 131-426. Calcutta, 1927. ISIS

Reviewed in *Nature*, 122, 46-48, 1928. See *Isis*, 9, 204.

Eustafieff, Victor K. The Znachary of the Ukraine. Witch doctors of the Ukraine. *Medical life*, 35, 547-53, 1928. ISIS

Fahrenfort, J. J. Het hoogste wezen der primitieven. Studie over het « oermonotheïsme » bij enkele der laagste volken. VIII + 311 p. Groningen, WOLTERS, 1927. ISIS

Reviewed by G. VAN DER LEEUW, *Deutsche Literaturzeitung*, 6, 5-8, 1929

Guiart, Jules. Un protecteur peu connu de la peste, SAINT NICOLAS DE TOLENTIN. Festschrift MAX NEUBURGER gewidmet, 144-49, Wien, 1928. ISIS

Lévy-Bruhl, Lucien. The « soul » of the primitive. Authorized translation by LILIAN A. CLARE. 351 p. London, ALLEN and UNWIN, 1928. ISIS

The French original text (1927) was reviewed in *Isis*, 9, 482-86.

Lyons, Sir Henry. The sailing charts of the Marshall Islanders. *The Geographical Journal*, 4, 325-28, 2 pl., 1928. ISIS

« Narrow strips of the centre-rib of a palm-leaf are arranged in certain forms and positions, and are tied together with lengths of palm fibre. » Curved rods would seem to indicate « the wave front of the swell caused by the prevalent winds. » « Currents in the neighbourhood of islands are sometimes shown by straight strips, and long straight ones may indicate the direction in which a certain island lies. Islands are marked by small shells which are tied on to the palm rib framework, and indicate only very approximately their positions. » Such charts were still in use in 1860. There were forty-three examples in European collections in 1902 but « others may have been acquired since. » « The most complete account of them is one by A. SCHÜCK, » Die Stabkarten der Marshall-Insulaner, Hamburg, 1902. J. K. W.

Métraux, A. La civilisation matérielle des tribus Tupi-Guarani. XIV + 331 p., 30 illus., 11 cartes. Paris, GEUTHNER, 1928 (100 frs). ISIS

Elaborate study of South American tribes made under the direction of ERLAND NORDENSKIÖLD with special reference to the rich collections of the Göteborg Museum. Many illustrations and maps showing distribution of cultural traits. The main purpose was to determine the original cradle of these tribes and their migrations. The author's literary investigations must now be completed by others made among the extant representatives of those tribes. Let us hope that he will break away from the European museums and continue his work in South America. G. S.

Ricketson, Oliver. Notes on two Maya astronomic observatories. *American Anthropologist*, 30, 434-44, 1928. ISIS

Schmidt, Wilhelm. Festschrift. Publication d'hommage offerte au Père WILHELM SCHMIDT. 76 sprachwissenschaftliche, ethnologische, religionswissenschaftliche, prähistorische und andere Studien. Hrsg. v. W. KOPPERS XXIV + 977 p., 41 pl., 158 illus. Wien, Mechitharisten-Congregations-Buchdruckerei, 1928. ISIS

Reviewed by S. R. STEINMETZ, *Deutsche Literaturzeitung*, 5, 2241-2244, 1928.

Teeple, John E. The lunar calendar and its relation to Maya history. (Maya inscriptions VI.) *American Anthropologist*, 30, 391-407, 1928. ISIS

Williams, F. E. Orokaiva magic. With a foreword by R. R. MARETT. XII + 231 p., 9 ill. Oxford, University Press, 1928. ISIS

Reviewed by GEORGE SARTON, *Isis*, 11, 401-403, 1928.

Wright, Jonathan (—). Medicine of primitive man. *Medical life*, 35, 590-95, 1928. ISIS

42. — ECONOMICS.

(*Economic doctrines and history, commerce. Transportation and communications.*)

Dale, Samuel S. Records of a universal science. A description of the library of weights and measures of SAMUEL S. DALE, Brookline, Mass. *Bulletin of The Business Historical Society*, 8 p., pl., Boston, Mass., February, 1929. ISIS

Rainoff, T. J. On economic equilibrium. (The problem of equilibrium in economics and classical mechanics). In Russian, accompanied by English summary. Reprinted from *Problems of Economic Con-*

ditions, 3, p. 93-165, ed. by The Conjuncture Institute, Moscow, 1927. ISIS

Rainoff, T. J. Economic equilibrium as a variation problem. In Russian with English summary. *Problems of Economic Conditions*, 4, 86-187, Moscow, 1928. ISIS

43. — SOCIOLOGY, JURISPRUDENCE AND POSITIVE POLITY.

Barnes, Harry Elmer. Living in the twentieth century. A consideration of how we got this way. 391 p. Indianapolis, BOBBS-MERRILL, 1928 ($ 3.50). ISIS

A very stimulating book which will help people to make up their own mind on the fundamental questions of our social life. It is divided as follows : 1. The old régime : the nineteenth century; 2. Scientific progress and its intellectual implications; 3. The coming of the empire of machines; 4. The revolution in power, transportation and communication; 5. Changes in material culture produced primarily by applied chemistry; 6. The factory system; 7. The newer capitalism and the proletarian challenge; 8. Social phases of the new régime; 9. Proposals for social and economic reconstruction; 10. Constitutional government, republicanism and democracy; 11. Nationalism, imperialism, war and peace; 12. The twentieth century creates the new history.

It will be noticed that a great part of the book is devoted to history, and even to the history of science and technology. In fact, it contains a summary of these aspects of our discipline which interest sociologists most. History is the beginning, the old background explaining « how we got this way », and the end, the new background enabling us to make rational plans for the future. My only criticisms are that the author, in spite of his historical experience, is sometimes a little too dogmatic (e.g., with reference to the failure of democracy) and that his style is sometimes too pungent. However I prefer an author who overreaches himself, as BARNES does, to one who is too timid. There is no doubt that the book, good as it is, would have been much better, if it had been composed more slowly. As BARNES is a fearless thinker, he will not mind a friends' admonition : if he goes on writing as carelessly as he does, his temporary influence and his income may increase, but he is doomed to ultimate oblivion. G. S.

Keyser, Cassius J. On the study of legal science. *Yale Law Journal*, 38, 413-22, 1929. ISIS

Mess, Henry A. Industrial Tyneside : a social survey, made for the Bureau of Social Research for Tyneside. 184 p., maps, and charts. London, ERNEST BENN, 1928. ISIS

An excellent survey, on LE PLAY lines, of an industrial region with its problems of housing and fluctuating employment, with a full recognition of geographical factors. Takes a broader view of the subject than most

surveys on purely economic lines, taking into account the educational and religious aspects of industrial life, and the relation between industrial conditions and mental characteristics. C. H. D.

Otlet, Paul, et Le Corbusier. Mundaneum. 46 p., 7 plans. Bruxelles, Palais Mondial, 1928. ISIS

« Il est proposé d'établir à Genève, toutes forces unies, le Mundaneum, une institution qui soit à la fois quartier général pour les associations, congrès, libres mouvements internationaux et centre scientifique, documentaire, éducatif, réalisant, au degré mondial, et avec la coopération des organismes officiels, les cinq grandes institutions traditionnelles du travail intellectuel : bibliothèque, musée, association scientifique, université, institut. Quelle est l'idée à la base du Mundaneum, — en quelle organisation la représenter, — par quel ensemble d'édifices, d'installations, de collections lui donner son propre corps, — à quelles activités régulières destiner l'institution, — quelles utilités et quels services en attendre ? Questions à l'examen desquelles est consacré le présent exposé. »

« *Mundaneum* : spectaculum mundi novissimumque humanitatis organum. *Materia*. Res. : unde veniunt, ubi et quales sunt. Homo : sicut cognoscit, sentit, atque agit. Imago universi : civilisationum genesis secundum historiam ; nationum per orbem extentio secundum geographiam ; naturae hominis societatisque explicatio secundum scientiam ; impressionum traductio secundum artem ; mentis corporisque formatio secundum educationem ; actuum ordinatio secundum organisationem. *Media*. Haec omnia quinque in institutionibus effecta. Museum, bibliotheca, universitas, institutum, societas. *Destinata* : labor et intellectus ; foederatio et cooperatio ; pax et progressus. »

Rougier, Louis. La mystique démocratique; ses origines, ses illusions. 280 p. *Bibl. de philosophie scient.*, Paris, FLAMMARION, 1929. ISIS

« Le Titre de Mystique démocratique avertit que l'on étudie, non une doctrine politique, mais sa déformation en religion irrationnelle, qui la transpose du libre examen sur celui du dogmatisme intolérant, du plan intellectuel sur celui de l'affectivité pure. Une doctrine devient mystique lorsqu'on la soustrait au contrôle de l'expérience et à l'épreuve de la discussion pour la traiter comme un dogme intangible, ou lorsqu'on la fonde sur une base qui n'a aucun sens empirique ou rationnel et qui exprime seulement une conviction passionnée... La mystique démocratique repose sur l'idée de l'"égalité naturelle de tous les hommes', laquelle n'est qu'un pseudo-concept, une notion fausse ». Rougier préconise la représentation des corps sociaux, et considère que le « grave problème de l'avenir n'apparait point tant la solution du pseudo-conflit du travail et du capital, dont les intérêts s'avèrent chaque jour plus solidaires, que le recrutement d'une élite spirituelle suffisamment indépendante, respectée et puissante, pour consacrer une part des énormes richesses créées par le régime capitaliste, à la réalisation des fins désintéressées qu'avait définies l'humanisme grec : l'activité esthétique, la science pure et l'art de vivre qui seuls qualifient une civilisation de grand style ». 1. La mystique démocratique ; 2. Le dogme de l'égalité naturelle et le messianisme politique ; 3. La mystique démocratique et la révolution française ; 4. Les origines bibliques de la mystique démocratique ; 5. Le pro-

testantisme et le capitalisme moderne; 6. La physionomie morale du monde moderne. L. G.

Social science abstracts. A comprehensive abstracting and indexing journal of the world's periodical literature in the social sciences. Vol. 1, nº 1, VI + 116 p., March, 1929. Publication office : Menasha, Wisconsin; editorial and executive office : 611 Fayerweather Hall, Columbia University, New York, N. Y. ISIS

The first number contains 781 notes duly classified. Subscription price, six dollars per year, including annual indices. G. S.

(Vinogradoff, Paul). Collected papers. With a memoir by the Right Hon. HERBERT ALBERT LAWRENCE FISHER. In two volumes. Vol. I., Historical. VIII + 326 p. Vol. II., Jurisprudence. VIII + 509 p. Oxford, Clarendon Press, 1927. ISIS

Wigmore, John H. A map of the world's law. *Geographical Review*, 114-20, 1929. ISIS

44. — HISTORY OF CIVILIZATION.

(*General history, historical methods, biography and chronology.*)

Bober, Mandell Morton. KARL MARX's interpretation of history. (*Harvard Economic Studies*, vol. 31.) XII + 370 p. Cambridge, Harvard University Press, 1925. ISIS

Reviewed by F. J. T., *American Historical Review*, 34, 129, 1928.

Deutsches Biographisches Jahrbuch. Bd. III. Das Jahr 1921. Hrsg. vom Verbande der Deutschen Akademien. 323 S. Stuttgart, Dtsch. Verl.-Anst., 1927. ISIS

Reviewed by HANS HERZFELD, *Deutsche Literaturzeitung*, 5, 2297-99, 1928.

Friedell, Egon. Kulturgeschichte der Neuzeit. Die Krisis der europäischen Seele von der schwarzen Pest bis zum Weltkrieg. Bd. I. XII + 414 S. München, C. H. BECK, 1928. ISIS

Reviewed by HABERLING, *Mitteilungen zur Geschichte der Medizin*, 27, 146-47, 1928.

Hackett, Charles Wilson (*editor*). Historical documents relating to New Mexico, Nueva Vizcaya, and approaches thereto, to 1773, collected by ADOLPH F. A. BANDELIER and FANNY R. BANDELIER; Spanish texts and English translations. 2 vols., XX + 502 p.; XI + 497 p. Washington, D. C., Carnegie Institution of Washington, 1923-1926. ISIS

Vol. I includes an important group of « reports relating to the services and merits of explorers and conquerors of New Spain » covering the period to 1590. J. K. W.

Lüdtke, Gerhard and **Mackensen, Lutz.** Deutscher Kulturatlas. Berlin, WALTER DE GRUYTER, 1928, etc. ISIS

The atlas will contain c. 500 maps covering synoptically the whole field of German culture. I have seen the three first instalments including 32 maps. They are very good indeed. The price to subscribers is M. 1.60 per 8 maps. G. S.

Means, Philip Ainsworth. Biblioteca Andina. Part One: The Chroniclers, or, the Writers of the sixteenth and seventeenth centuries who treated of the pre-Hispanic history and culture of the Andean countries. *Transactions of the Connecticut Academy of Arts and Sciences*, 29, 271-525, 1928. ISIS

First part of a proposed « guide which will indicate the general content of the vast literature relative to the ancient history and civilization of the peoples of the Andean area... (and) will list and describe all that I shall have been able to discover of the works, ancient and modern, wherein the history and policy of the Andean area in the days prior to the Spanish Conquest are discussed. » In the present volume forty-five chroniclers and historians are treated in alphabetical order. J. K. W.

45. — HISTORY OF ART.

(Art and science, iconography. Arts and crafts).

Antz, E. L. Aus der Geschichte der Keramik in Deutschland. *Beiträge zur Geschichte der Technik und Industrie*, 12, 136-158, 45 fig., 1922. ISIS

Martinotti, Giovanni. Una danza macabra del GUERCINO. Festschrift MAX NEUBURGER gewidmet, 249-56, illus., Wien, 1928. ISIS

Marvin, F. S. and **Clutton-Brock, A. F.** Art and civilization. 272 p. (The Unity Series, 8) London, Oxford University Press, 1928. ISIS

Contents: 1. Introductory. By F. S. MARVIN; 2. The origin of art. By G. ELIOT SMITH; 3. Prehistoric art. By DINA PORTWAY DOBSON; 4. The Greek revelation. By MICHAEL HOLROYD; 5. Later Greek and Roman art. By MICHAEL HOLROYD; 6. The art of Asia. By LAURENCE BINYON; 7. Old Christian art. By JOSEPH STRZYGOWSKI; 8. Medieval art. By JOSEPH STRZYGOWSKI; 9. The art of the Renaissance. By H. GLUECK; 10. Italian art of the sixteenth and seventeenth centuries. By Mrs. STRONG; 11. The seventeenth and eighteenth centuries. By A. F. CLUTTON-BROCK; 12. The nineteenth century. By A. F. CLUTTON-BROCK; 13. Art in a modern democracy. By F. S. MARVIN.

46. — HISTORY OF LANGUAGE, WRITING AND LITERATURE.

Ivins, William M., jr. List of lettering and writing books in the print room of the Metropolitan Museum of Art. *Bulletin of the Metropolitan Museum of Art*, 23, 297-99, ill., 1929. ISIS

Jespersen, Otto. An international language. London, ALLEN and UNWIN, 1928. ISIS

A plea for an artificial language that shall be merely auxiliary, and by no means supplant the existing languages of the world.

Kunow, Amelie Deventer v. Kryptographie oder Geheimschriftkunde. *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 215-18, 1928. ISIS

VIII. MEDICINE.

50. — HISTORY, ORGANIZATION, AND PHILOSOPHY OF MEDICINE.

Aschner Bernhard. Der Wert medizingeschichtlichen Studiums für die Erziehung und das praktische Handeln des Arztes. Festschrift MAX NEUBURGER gewidmet, 22-31, 1928. ISIS

Burger, H. The appreciation of the medical profession and the divine origin of medicine. *Annals of Medical History*, 1, 37-49, 1929. ISIS

Buttersack, F. Ärztliche Betrachtungsweisen. *Archiv für Geschichte der Medizin*, 22, 48-59, 1929. ISIS

Castiglioni, Arturo. Storia della Medicina. XII + 960 p., 389 fig. Milano, Societa editrice « Unitas », 1927. ISIS

Professor CASTIGLIONI has written in a fluent, vivacious, and interesting manner, an excellent general survey of the development of medicine. The book is abundantly illustrated and includes many pictures not usually found in standard texts. Among those not readily available elsewhere are pictures of EUSTACHIO, CESALPINO, VALSALVA, PACHIONI, MATTIOLI, GALVANI, and of many of the great 19th and 20th century Italian medical leaders. The addition of reproductions of paintings of medical interest and of an occasional medical cartoon lightens the pages. There is a short bibliography at the end of each chapter and a general bibliography covering the scope of the book. This, unfortunately, omits reference to W. H. S. JONES' work on the Hippocratic collection, SINGER's studies of MONDINO, and of CLIFFORD ALBUTT's survey of Greek medicine in Rome. There is a good subject and author index. C. D. L.

Castiglioni, Arturo. Italienische Lehrer und Ärzte an der Wiener medizinischen Schule. Festschrift MAX NEUBURGER gewidmet, 66-78, illus., Wien, 1928. ISIS

Cushing, Harvey. Concrecratio medici and other papers. 276 p. Boston, LITTLE, BROWN and Company, 1928. ISIS

This group of sixteen essays, many of which have appeared in other places, is written in CUSHING's most delightful style. It includes charming appreciations of OSLER, LISTER and GARTH, together with general essays on men, books, and medical practice. It should be a delight to the general reader interested in medicine. C. D. L.

Davis, David J. The Quakers and medicine. *Bulletin of the Society of Medical History of Chicago*, 4, 77, Apr., 1928. ISIS

The chief English Quaker physicians were JOHN FOTHERGILL (1712-1780), JOHN LETTSOM (1744-1815), and JOSEPH LISTER (1827-1912). One of the chief American Quaker physicians was THOMAS CADWALADER (1708-1779), first teacher of medical anatomy in America and author of the first American medical monograph, « An essay on West India dry gripes » (lead poisoning) published by BENJAMIN FRANKLIN in 1745. JOHN MORGAN (1735-1789), « father of medical education in North America » was another prominent American Quaker. C. D. L.

Fischer, I. Zur Geschichte des ärztlichen Standes. (MICHAEL BOUDEWYNS, JOHANN SAMUEL CARL). Festschrift MAX NEUBURGER gewidmet, 90-6, Wien, 1928. ISIS

Garrison, Fielding H. Dangers besetting the literature of recent medicine. Festschrift MAX NEUBURGER gewidmet, 124-28, Wien, 1928. ISIS

Hemmeter, John C. Mutationen in geschichtlichen Begriffen und der Zusammenhang medizinischer Ideen und Lehren. Festschrift MAX NEUBURGER gewidmet, 160-71, Wien, 1928. ISIS

Irsay, Stephen d'. The evolution of the physician's attitude. *Annals of medical history*, 10, 376-86, 1928. ISIS

Irsay, Stephen d'. An historical dictionary of medicine. *Kyklos*, 1, 157-59, 1928. ISIS

Lustenberger, Fridolin. Schweizerische medizinisch-naturwissenschaftliche Zeitschriften von 1751-1871, ihre Bedeutung und ihre Ziele. 85 p. Zürich, LEEMANN, 1927. ISIS

Miller, William Snow. The WILLIAM SNOW MILLER Festschrift:

Contributions by the friends, associates and pupils of Dr. WILLIAM SNOW MILLER, assembled on the occasion of his seventieth birthday, March 29, 1928, and published under the auspices of the Phi Beta Pi medical fraternity, being pp. 83 to 238 of the volume 25 of the Quarterly of the Phi Beta Pi medical fraternity. ISIS

Here is a very worthy effort by a professional fraternity. Often these peculiar American institutions foster sophomoric and selfish ideals but the MILLER Festschrift seems to be a real attempt to contribute something worth while to literature. The fifteen papers were collected too late to attempt special publication when the medical fraternity of which Doctor MILLER is an honorary member offered to publish them in order to show its appreciation of Doctor MILLER's great work on the lung. It also established an annual lecturship in his honor at the University of Wisconsin Medical School.

The Festschrift (extra copies of which were printed and given to Doctor MILLER for distribution) includes a portrait, biography and bibliography of Doctor MILLER. There is also an appreciation by Col. F. H. GARRISON of his work in developing post graduate interest in the history of medicine to which is appended a bibliography of Doctor MILLER's Wisconsin Medical History Seminar.

The most significant paper in the Festschrift is an exhaustive study of ERNST HEINRICH WEBER (1795-1878), with illustrations and copious notes, by PERCY M. DAWSON. One of Professor DAWSON's most delightful essays, this is a fitting companion to his study of STEPHEN HALES and of FRANCOIS MAGENDIE, a trilogy of great names in the history of the physiology of the circulation.

Another important paper is « On Dr. JOHN COAKLEY LETTSOM and his Relations with Capt. JONATHAN CARVER, the Explorer of Lake Pepin », by VICTOR CLARENCE JACOBSEN. JOHN COAKLEY LETTSOM (1744-1815), the founder of the London Medical Society and biographer of JOHN FOTHERGILL (1712-1780) was a philanthropic Quaker physician, who apparently took great interest in the American colonies. He corresponded with WASHINGTON, FRANKLIN and RUSH and was the first to send JENNER's vaccine to America. He became acquainted with JONATHAN CARVER (1732-1780) through the latter's attempt to hold him up on the streets of London. Desiring to help the highwayman who had previously spent the years 1766-1768 in exploring the Dakotas, Minnesota and Wisconsin, LETTSOM assisted in the publication of CARVER's experiences, « Travels Through the Interior Parts of North America ». Professor T. H. BAST contributes a valuable biographical sketch of CARL ERNST VON BAER (1792-1876), the embryologist. Prof. WALTER J. SULLIVAN has added a biographical sketch of THOMAS DWIGHT (1843-1911), Parkman Professor of Anatomy at Harvard Medical School. There are also included in the Festschrift, notes on THOMAS SYDENHAM (1624-1689) by Dr. C. H. BUNTING, and on BICHAT (1771-1802) by Dr. E. M. MEDLAR. Several other interesting general papers, including a survey of the work of WILLIAM HARVEY by Dr. F. J. HODGES, and an essay on « Medical Practices in Turkey » by Dr. P. F. GREEN, conclude the effort.

(*University of California*) CHAUNCEY D. LEAKE.

Neuburger, Max. Festschrift zur Feier seines 60. Geburtstages am 8. Dezember, 1928. MAX NEUBURGER gewidmet von Freunden,

Kollegen, und Schülern. Internationale Beiträge zur Geschichte der Medizin. VIII + 333 p. Verlag des Fest-Komitees, Wien, VIII., Langegasse, 60, 1928. ISIS

The papers collected in this beautiful Festschrift are classified in the present bibliography. It also includes a bibliography and a portrait of MAX NEUBURGER. Our every good wish for the continuation of his health and activity for many years to come. G. S.

New York Academy of Medicine. Catalogue of an exhibition of early and later medical Americana. 20 pl. New York, 1926. ISIS

A very interesting catalogue including 95 items, many of which are illustrated. G. S.

Sigerist, Henry E. III. Bericht über die Tätigkeit des Instituts im Jahre 1926-27. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 160-69, 1928. ISIS

Sigerist, Henry E. Enzyklopädie und Methodologie der Medizin. Festschrift MAX NEUBURGER gewidmet, 273-77, Wien, 1928. ISIS

Sigerist, Henry E. Die Geschichte der Medizin im akademischen Unterricht. Ergebnisse einer Rundfrage des Instituts. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 147-156, 1928. ISIS

Sigerist, Henry E. Hollands Bedeutung in der Entwicklung der Medizin. *Deutsche Medizinische Wochenschrift*, n° 36, Reprint, 8 p., 7 fig., 1928. ISIS

Sigerist, Henry E. Kultur und Krankheit. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 60-3, 1928. ISIS

Sigerist, Henry E. History of medicine in academic teaching. Results of a questionnaire of the Institute. Translated from *Kyklos*, by EMILIE RECHT. *Medical life*, 41-55, 1929. ISIS

Singer, Charles. A short history of medicine, introducing medical principles to students and non-medical readers. XXIV + 368 p. Oxford University Press, New York, 1928 ($ 3.50). ISIS

Here is an ideal volume to serve as an introduction to the history of medicine. It is written in Doctor SINGER's usual brilliant fashion and is splendidly illustrated with 142 well-chosen pictures. It is by no means a parade of names and dates but is a rather successful attempt to arrive at a general

philosophical analysis of the many factors involved in the development of modern medicine. It concludes with a remarkable epilogue surveying the present situation, calling attention to the difficulties of progress and emphasizing the broad principles in which general advances in this field may be made. There is an excellent index. C. D. L.

Tesdorpf, Paul. Betrachtungen über die Aufgaben der medizinischen Geschichtsschreibung. Festschrift MAX NEUBURGER gewidmet, 296-99, Wien, 1928. ISIS

Wehrli, G. A. Der Arzt als Kalenderschreiber. Festschrift MAX NEUBURGER gewidmet, 308-15, Wien, 1928. ISIS

Zwick, Karl G. The origin and significance of the medical emblem. *Bulletin of the Society of Medical History of Chicago*, 4, 94, Apr., 1928. ISIS

The classic symbol is the serpent staff of Aesculapius and not the caduceus of Mercury, although the latter seems to have been adopted by the United States Army Medical Corps. C. D. L.

51. — EPIDEMIOLOGY, HISTORY OF SPECIAL DISEASES. PUBLIC HEALTH AND SOCIAL MEDICINE.

Adam, H. A. Geisteskrankheit in alter und neuer Zeit. Ein Stück Kulturgeschichte in Wort und Bild. 160 S., 96 Abb. Regensburg, RATH, 1928. ISIS

Agramonte, Aristides. A review of research in yellow fever. *Annals of Internal Medicine*, 2, 1-38, Aug., 1928. ISIS

This is especially valuable from an historical point of view because it gives the scientific impressions on the subject as they appear to one of the famous quartette comprising the Yellow Fever Commission of the United States Army, the work of which led to the control of the disease. C. D. L.

Barach, Joseph H. Historical facts in diabetes. *Annals of medical history*, 10, 387-401, 1928. ISIS

Borak, J. Zur Geschichte des Krankheitsbegriffes der Ostitis fibrosa. Festschrift MAX NEUBURGER gewidmet, 54-65, Wien, 1928. ISIS

Chaumartin, Henri. Quelques documents et pièces d'archives pour servir à l'histoire du feu Saint-Antoine. *Bull. de la société française d'histoire de la médecine*, 22, 375-81, 1928. ISIS

Ebstein, Erich. Die klinische Geschichte des Urometers. Festschrift MAX NEUBURGER gewidmet, 83-89, 3 Abb., Wien, 1928. ISIS

Fraser-Harris, D. The exact significance of « plague, pestilence, famine and sudden death » in the Litany. *Medical life*, 35, 541-46, 1928. ISIS

Freund, Leopold. Vergessene Pioniere der Lichttherapie. Festschrift MAX NEUBURGER gewidmet, 97-104, Wien, 1928. ISIS

Glaser, Erhard. Seuchen und Krieg in vergangenen Zeiten. Festschrift MAX NEUBURGER gewidmet, 129-35, Wien, 1928. ISIS

Gray, Irving. Zur Geschichte der Gastro-Enterologie in den Vereinigten Staaten. Festschrift MAX NEUBURGER gewidmet, 136-40, Wien, 1928. ISIS

Jellinek, Stefan. Entstehung und Entwicklung der Elektro-pathologie. Festschrift MAX NEUBURGER gewidmet. 198-202, Wien, 1928. ISIS

Moore, Harry H. American medicine and the people's health : an outline with statistical data on the organization of medicine in the United States with special reference to the adjustment of medical service to social and economical change. 647 p. New York, D. APPLETON, 1927. ISIS

A source book for information regarding current medical organization in the United States. C. D. L.

Rolleston, Humphry Davy. Cardio-vascular diseases since HARVEY's discovery. The Harveian Oration, delivered before the Royal College of Physicians of London on 18 October, 1928. Cambridge University Press, 1928. ISIS

52. — HISTORY OF HOSPITALS AND OF MEDICAL TEACHING.

Grósz, Emil von. Geschichte der Augenklinik Nr. 1 der Königl. ungar. Universität in Budapest. Festschrift MAX NEUBURGER gewidmet, 141-43, Wien, 1928. ISIS

Hellinga, G. De amsterdamsche Pesthuizen. *Bijdragen tot de geschiedenis der geneeskunde*, 8, 357-83, ill., 1928. ISIS

Hellinga, G. Het pesthuis na den brand, (1732 tot ongeveer 1839). *Bijdragen tot de geschiedenis der geneeskunde*, 9, 1-28, illus., 1929. ISIS

Hochsinger, Carl. Zur Geschichte des ersten oeffentlichen Kinder-Kranken-Institutes in Wien. Festschrift MAX NEUBURGER gewidmet, 172-82, Wien, 1928. ISIS

Ortner, Norbert. Zur Geschichte der II. Wiener medizinischen Universitätsklinik. Festschrift MAX NEUBURGER gewidmet, 265-68, Wien, 1928. ISIS

53. — PHARMACY. PHARMACOLOGY. TOXICOLOGY.

Andel, M. A. van. Klassieke wondermiddelen. *Bijdragen tot de geschiedenis der geneeskunde*, 8, 285-94, 1928. ISIS

Benedicenti, Alberico. Malati, medici e farmaciste. Storia dei rimedi traverso i secoli e delle teorie che ne spiegono l'azione sull' organismo. Vol. 1, XX + 879 p. Vol. 2., VIII + 729 p. Milano, ULRICO HOEPLI, 1924. ISIS

The twenty-six chapters of this comprehensive work tell the story of the development of drug therapy from earliest times. It is very well illustrated with nearly 500 pictures, some of them unfortunately made from poor cuts. The prevailing influence of the Dioscoridean tradition from the second to sixteenth centuries is especially well brought out. One chapter is devoted to the life and influence of PARACELSUS. Interesting evidence is brought forward to indicate that CONRAD GESNER (1516-65) deserves recognition as the first experimental pharmacologist. There is a particularly comprehensive discussion of the factors responsible for the development of modern pharmacology. The author is to be heartily congratulated for assembling what must serve as a source book for the history of this increasingly important subject. See *Isis*, 8, 650. C. D. L.

Benedicenti, Alberico. Contributi sperimentali alla storia della medicina. Festschrift MAX NEUBURGER gewidmet, 32-37, Wien, 1928. ISIS

Contents : 1. Su un campione di triaca conservato nell' Ospedale Pammatone di Genova; 2. Sul preteso tamarindo della tomba di Kha; 3. Sulla scilla di Homs e su un processo usato degli antichi egiziani nelle preparazioni medicinali scillitiche; 4. Su un olio medicato della tomba di Kha.

Heyser, Kurt. Die Alliumarten als Arzneimittel im Gebrauch der abendländischen Medizin. Sonderdruck aus *Kyklos*, Jahrbuch des Instituts für Geschichte der Medizin an der Universität Leipzig, 1, 64-102, 1928. ISIS

54. — EDUCATION.
(*Generalities, methods, colleges, universities*).

Bonnerot, Jean. La Sorbonne, sa vie, son rôle, son œuvre à travers

les siècles. VIII + 328 p., 28 pl. h.t. Les Presses universitaires de France, Paris, 1927. ISIS

JEAN BONNEROT, bibliothécaire à la Sorbonne, a entendu ne donner dans ces pages « qu'un simple mémorial de la grande maison universitaire », issue de celle que LOUIS XI accorda en février 1257 à son chapelain ROBERT DE SORBON (1201-1274) pour y établir une demeure à l'usage des pauvres maîtres étudiants en théologie, singulièrement agrandie par RICHELIEU, et devenue sur les plans de H. P. NÉNOT, et grâce à l'action de OCTAVE GRÉARD, l'actuelle Sorbonne entre 1885 et 1900, que complètent d'ailleurs de nombreuses annexes disséminées dans Paris, et les laboratoires de province. Le reste de l'ouvrage est occupé par la description de la Sorbonne d'aujourd'hui; cette description est l'occasion d'un grand nombre de courtes notes biographiques en rapport avec les œuvres d'art qui abondent dans le monument.

L. G.

55. — ACADEMIES, SOCIETIES, CONGRESSES.

Bericht über die Verhandlungen der deutschen Gesellschaft für Geschichte der Medizin und der Naturwissenschaften zu Hamburg, am 17-20 September 1928. *Janus*, 32, 389-419, 1928. ISIS

Comité international et centre international d'histoire des sciences. *Janus*, 33, 46-48, 1929; *Archeion*, 9, 497-509, 1928 (*see Isis*, 12, 323). ISIS

57. — MUSEOLOGY (*Museums and collections*).

Hackin, J. et Grousset, R. Le Musée Guimet, 1918-1927. (Bib. de Vulgarisation, 48). Paris, Musée Guimet, 1928. ISIS

Schuster, Julius. Geschichte und Idee des naturwissenschaftlichen Museums. Vortrag bei der Gründungs-Tagung des « Bundes der deutschen naturwissenschaftlichen Museen ». *Archiv für Geschichte der Mathematik, der Naturwissenschaften, und der Technik*, 11, 178-92, 5 Abb., 1928. ISIS

59. — ERRATA AND ADDENDA, nº 18.

(*For previous errata, see Isis*, 12,441).

Isis, vol. 11, 1928.

p. 202, last note, read LÉON, XAVIER.

p. 220, second note of Middle Ages, read MAUDE VIOLET CLARKE (not Clark).

p. 326, lines 3 and 4 from bottom:

Through an inadvertence of mine the name « Bird » appeared on the 3rd and 4th lines from the bottom of page 326 of my article upon WIN-

THROP. The correct spelling is « BYRD », the same spelling which is adopted by his illustrious descendants, the present Governor of Virginia and the Explorer to the Antarctic. C. A. Browne.

p. 375, plate 7, read 1854 (not 1856).

SARTON's *Introduction to the History of Science*, vol. 1, 1927.

p. 128, line 10, read masterly rather than masterful.

p. 180, Note-marks a, b, c, d, omitted in the text (it is easy to add them.)

p. 217, line 1, read 1752 instead of 1572.

p. 272, note THEON, paragraph 2, read NICOMACHOS.

p. 782, NATHAN BEN JEHIEL (not Jeliel). The correct transliteration from the Hebrew would be YE'Î'ÊL, but JEHIEL (or JEIEL) is found in the English O. T.

p. 822, octaëteris, 72, 117.

A few other misprints are not mentioned in these errata because they are too obvious to cause any error or confusion. I wish to express my thankfulness to the readers who take the trouble to make the above-mentioned corrections in their copies of *Isis* and the *Introduction*. I would advise them, after having accomplished that little task, to write their initials near mine at the bottom of this note, thus to indicate that these and the previous errata have been taken into account. G. S.

These and previous errata have been corrected by...

The corrections have been made in the card index by...

Authors' Index to the Twenty-Sixth Bibliography

The Roman figures refer to centuries; the Arabic figures, to the sections of Parts II and III, which are numbered consecutively from 1 to 59. This index will enable one to find more easily the papers analyzed in the present bibliography, and also to see at a glance what each writer is doing.

April 3, 1929. FRANCES SIEGEL.

A

Abbot, C. G., XX B.
Abû Ma'shar, IX (1).
Achelis, J. D., XVI (1) D.
Acharya, P. K., 9.
Adam, H. A., 51.
Adams, E. D., XIX (2) B.
Adams, F. D., XVII (2) C, 31, 32.
Agramonte, A., 51.
Ahimaaz, XI (2).
Alembert, J. d', XVIII (1) A.
Alfasi, XI (2).
Ali, Syed Ameer, 14.
Allen, H. S., 24.
Allen, J. W., XVI (1) E.
Allers, R., XVII (1) D.
Allulli, R., XIII (2).
Almagià, R., XVI (1) C.
Almkvist, J., 14.
Altekar, A. S., 9.
Amat y Juinent, M.de,XVIII (2) C.
Anan b. David, VIII (2).
Andel, M. A. van, XVII (1) D, 53.
Anesaki, M., XVII (1) C, 8.
Antevs, E., 32.
Anthinus, VI (1).
Antoniadi, E. M., XIX (1) B.
Antz, E. L., 45.
Arrianus, F., II (1).
Aryabhata, V (2).
Aschner, B., 50.
Asín, J. O., 6.
Asín Palacios, M., XI (1), XIII (1).
Aslan, K., 8.
Atlantisfrage, 1.
Augustin, St., V (1).

B

Bacon, R., XIII (2).
Baker, J. N. L., XVII (1) C.
Balta, J., XIX (1) C.
Banks, Sir J., XVIII (2) C.
Barach, J. H., 51.
Baratta, M., XV L.
Barnes, H. E., 43.
Barthel, E., XVIII (2) A.
Barthold, W., 8, 14.
Basset, R., 14.
Bateson, W., XIX (2) C.
Baumann, E. D., XVI (2) D.

Belaiew, N. T., 3.
Bell, Sir C., 8.
Benedicenti, A., 53.
Benini, R., XIV (1).
Benson, E. F., XVI (2) C.
Berczeller, L., 36.
Berg, L. S., 31.
Berghoff, E., XIX (1) D.
Berkey, C. P., 10.
Bernhard, O., 1.
Berthelot, A. 1.
Billiard, R., I (2) B. C.
Bishop, L. F., jr., XIX (1) D.
Bishop, R. P., XVI (2) C.
Blokh, M. A., XIX (2) B, 17, 25.
Bludau, A., IV (2).
Bober, M. M., 44.
Bodding, P. O., 40.
Boffits, G., 4.
Bolland, W. C., 6.
Bologa, V. L., XVIII (2) D.
Bolton, H. E., XVIII (2) C.
Bone, W. A., XIX (1) B.
Bonnerjea, B., 9.
Bonnerot, J., 54.
Borak, J., 51.
Borchardt, P., 1.
Borenius, T., 6.
Born, L. K., 6.
Boxer, C. R., XVII (1) C.
Boyce, G. C., 6.
Brackett, R. N., XIX (2) B.
Bragg, Sir W., 24, XX B.
Bragg, W. L., XX B.
Brahe, T., XVI (2) B.
Bragman, L. J., XIX (1) D.
Brandt, F., XVII (1) E.
Breasted, J. H., 1.
Bridgman, P. W., 18.
British Museum, 31.
Brockman, C. J., 24.
Brown, A., XIV (2).
Browne, C. A., XVII (2) B, XIX (1) B, XIX (2) B, 25.
Buchheit, G., 6.
Budge, Sir E. A. W., XIII (2), 6.
Bünge, P., 39.
Bunten, A. C., XVII (1) E.
Burger, H., 50.
Burkitt, M. C., 39.
Bushnell, D. I., jr., XIX (2) C.
Buttersack, F., 50.
Buzurg ibn Shahriyâr, X (2).
Byron, R., 7.

C

Cable, M., 8.
Caddeo, R., 31.
Cajori, F., III (2) B. C., XVII (1) A, 20.
Caley, E. R., 25.
Camp, C. C., 20.
Campbell, N. R., 24.
Cao, G. B., XIV (1).
Caraci, G., XVI (1) C, XVI (2) C.
Caskie, J. A., XIX (1) C.
Castiglioni, A., 50.
Caulfield, E., XVIII (1) D.
Chamberlin, T. C., 23.
Chance, B., XIX (1) D.
Chao, Y., 10.
Charcot, J. B., XV (2).
Charles-Roux, F., XVIII (1) E.
Chatterji, B. R., 9.
Chatterton, E. K., XVII (1) C.
Chaumartin, H., 51.
Childe, V. G., 1.
Clark, J. M., XVIII (2) E.
Clutton-Brock, A. F., 45.
Cohn, A. E., XVII (1) D.
Colin, E., 31.
Combes, M., XIX (1) D.
Conant, K. J., XII (1).
Contenau, G., 8.
Conway, R. S., I (2) B. C.

Coolidge, J. L., XIX (1) A.
Cooper, L., VI (1).
Cortes, H., XVI (1) C.
Cosson, C., 8.
Costa, S., XVI (1) D.
Coulton, G. G., XIV (1).
Coupland, R., XIX (2) C.
Crinivasa, A. P., 9.
Cumming, Sir J. G., 9.
Cusching, H., 50.

D

Dalhke, P., 9.
Dale, S. S., 42.
Dannemann, F., 16.
Darmstaedter, E., XVI (1) B.
Das, S. R., 9.
Datta, B., 9.
David b. Abraham, X (2).
Davids, C. A. F. R., VI B. C.
Davis, D. J., 50.
Davis, W. M., 32.
Davison, E. S., 6.
De Waard, C., XVII (2) C.
Delaunay, P., XVIII (2) D.
Democritos, V B. C.
Dept, G. G., XIII (1).
Desch, C. H., 3.
Deutsches Biographisches Jahrbuch, 44.
Diehl, C., 7.
Dingler, H., 18.
Donazzolo, P., XVIII (1) C.
Donnolo, X (2).
Dorsey, G. A., XIX (2) C.
Douglas, D. C., 6.
Douglas, P. H., XVIII (2) E.
Drecker, J., VI (1).
Du Bois-Reymond, E., XIX (2) C.
Dubs, H. H., III (1) B. C.
Dunash b. Labrat, X (2).
Dunnington, F. P., XIX (2) B.
Dutt, N., 9.

E

Ebersolt, J., 7.
Eckstein, O., 10.
Eddington, A. S., 18.
Eden, Sir F. M., XVIII (2) E.
Einstein, A., XVII (2) A.
Eisenstein, J. D., 12.
Ellam, J. R., 8.
Emden, A. B., 6.
Englert, L., 1.
Errera, C., 31.
Ebstein, E., 51.
Eude, E., XVI (1) C.
Eustafief, V. K., 40.
Euwens, P. A., XVII (1) C.
Evans, I. H. N., 8.

F

Fahrenfort, J. J., 40.
Farley, D. L., XIX (1) D.
Farquhar, F. P., XVIII (2) C.
Fauré-Fremiet, E., 34.
Feis, O., XVI (1) C.
Feldhaus, F. M., XVII (1) A, XVII (2) A, 20, 26.
Ferguson, J. C., 8.
Fischer, I., 50.
Fordham, Sir H. G., XVI (2) C, 31.
Forke, A., 10.
Forschungen zur Geschichte d. Optik, 24.
Forsey, G. F., XI (1)
Fosseyeux, M., XIX (1) D.
Fraser-Harris, D., 51.
French, F., 8.
Freud, S., XX D.
Freund, L., 51.
Frey, H., XVII (2) D.
Friedell, E., 44.

Fritz, J., XVIII (1) D.
Froger, F., XVII (2) C.

G

Gabba, L., XVIII (2) C.
Gabet, J., XIX (1) C.
Gage, T., XVII (1) C.
Ganguli, S. K., 9.
Garrison, F. F., 50.
Garrison, F. H., XVII (1) D.
Gaselee, S., 6.
Geography Congress, 31.
Getty, A., 9.
Ghisleri, A., 31.
Ghoshal, U. N., 9.
Giannitrapani, L., 1.
Gibbs, J. W., XIX (2) B.
Gilbert, A. H., XIV (1).
Gillain, O., 2.
Gins, H. A., XVIII (2) D.
Giudici, P., XVI (1) C.
Glaser, E., 51.
Goichon, A. M., 14.
Goligher, W. A., 4.
Gottschalk, P., XV (2).
Goulet, R., XVI (1) E.
Grabmann, M., XIII (2), 6.
Grandgent, C. H., 6.
Gray, I., 51.
Grósz, E. v., 52.
Grousset, R., 57.
Grunth, P., XVIII (2) D.
Guiart, J., 40.
Gunther, R. T., XVII (2) E, 6.

H

Haberling, W., XVI (2) D, XVII (2) D, XIX (1) C.
Hackett, C. W., 44.
Hackin, J., 57.
Haig, Sir W., 9.
Haldane, J. B. S., 18.
Hall, C. R., XVIII (2) B.
Hall, H. R., 3, 39.
Hanson, W. G., 6.
Harcourt, R., XVII (1) C.
Hartig, P., XIII (2).
Harvey, W., XVII (1) D.
Hasdai ibn Shaprut, X (2).
Hayden, Sir H., 8.
Hayyuj, X (2).
Heberden, W., XVIII (2) D.
Hebrew scriptures, X (1).
Hellinga, G., 52.
Hemmeter, J. C., 50.
Henderson, L. J., 36.
Hendrichs, F., 26.
Hennig, R., V B. C., 1, 6.
Henning, H., 36.
Heras, H., 9.
Hermannsson, H., XVIII (2) C.
Herrick, J. B., XVIII (2) D.
Herrmann, A., IX B. C.
Herzfeld, E. E., 8, 13.
Heyser, K., 53.
Hobbes, T., XVII (1) E.
Hochsinger, C., 52.
Hollander, J. H., XVIII (2) E.
Holman, B. W., 1.
Holt, W. L., XIX (2) D.
Holzknecht, G., XIX (2) B.
Hopkins, A. A., 26.
Hoppe, E., 20.
Huber, F., XIX (1) C.
Huc, E. R., XIX (1) C.
Hübotter, F., 8.
Hümmerich, F., XV (2).
Hug, G., 14.
Hulme, E. W., XIX (1) B.
Hult, O. T., XVI (2) D, XVIII (2) D.
Hume, E. E., XIX (2) D.
Hummel, A. W., 10.
Hunger, F. W. T., XVI (2) D.

I

Ibn Gabirol, XI (1).
Ibn Ḥammâd, XIII (1).
Ibn Ḥazm, XI (1).
Ibn Janâḥ, XI (1).
Ibn al-Jazzâr, X (2).
Ibn Sînâ, XI (1).
Ibn abî Ya'qûb al-Nadîm, X (2).
Ikbal Ali Shah, S., 8.
Iorga, N., 31.
Ipat'ev, V. N., 25.
Irsay, S. d', 6, 18, 36, 50.
Ischer, A., XVIII (2) E.
Isḥâq al-Isrâ'îlî, X (1).
Ispizúa, S. de, 31.
Ivins, W. M., jr., 46.

J

Jâbir ibn Haiyân, VIII (2).
Jackson, D., 20.
Jackson, J. H., XIX (2) D.
Jansen, W., XII (2).
Jeans, Sir J., 24.
Jeanselme, E., XV (2).
Jehuda b. Quraish, IX (1).
Jellinek, S., 51.
Jespersen, O., 46.
Johnson, W., XVIII (2) C.
Johnsson, J. W. S., XVII (2) D, XVIII (2) D, XIX (1) D.
Joshua b. Judah, XI (2).
Journal of Physiology, 36.

K

Kâlidâsa, 9.
Kantorowitz, E., XIII (1).
Kazi, D., 8.
Keith, Sir A., 36.
Kennelly, A. E., 24.
Kern, R. A., XIV (2).
Keynes, G., XVII (1) D.
Keyser, C. J., 19, 43.
al-Kindî, IX (1).
Kirfel, W., 9.
Koch, R., V B. C.
Körber, H., XX D.
Körner, O., IX B. C.
Kokomoor, F. W., XVII (1) A.
Koopman, J., 36.
Kordes, H., XIX (1) B.
Krekich, A., XVIII (2) D.
Krom, N. J., 8.
Krumbhaar, E. B., XVII (1) D.
Kunow, A. D. v., 46.

L

Lacroix, A., 32.
Lalande, A., 19.
Lamster, J. C., 8.
Landon, P., 8.
Landgraf, E., IX (1).
Langlet, E., 8.
Lansdowne, Marquis of, XVII (2) E.
Lappo-Danilevskii, A. S., XIX (2) E.
Lattimore, O., 8.
Lauber, H., 36.
Laufer, B., 26.
Laurent, F., XVIII (2) B.
Le Coq, A. v., 8.
Le Corbusier, 43.
Leffmann, H., XIX (1) B.
Le Roy, E., 37.
Lévi-Provençal, E., 14.
Levinson, A., 34.
Levy, R., XII (1).
Lévy-Bruhl, L., 40.
Li, Chi., 10.
Liang Chi-chao, 10.
Lillie, R. S., 18, 27.
Lippmann, E. O. v., XIX (1) B, 4, 25.

Lockyer. T. M., XIX (2) B.
Lockyer, W. L., XIX (2) B.
Lodge, Sir O., 24.
Löffler, E., 20.
London, 5.
Longhena, M., XV (1).
Loria, G., 20.
Lot, F., 6.
Lovett, B. R., XIX (1) D.
Lowe, J. H., XI (2).
Lucas, A., 2.
Lüdtke, G., 44.
Luedy, F., jr., 25.
Lulofs, H. J., II (2).
Lustenberger, F., 50.
Lyman, G. D., XIX (2) D.
Lyons, Sir H., 40.

M

Mach, E., 18.
Mackensen, L., 44.
Mac Leod, J. J. R., XVII (1) D.
Macler, F., 8.
Maeterlinck, M., 29.
Magnaghi, A., XV (2).
Mahaffty, Sir J. P., 4.
Malloch, A., XVII (1) D.
Manfroni, C., XVI (1) C.
Manitius, M., XII (1).
Marcus, E., XVIII (2) E.
Maresch, R., XIX (1) D.
Marie, A., 37.
Martin, A., XVIII (1) B.
Martinotti, G., 45.
Marvin, F. S., 9, 45.
Marx, A., XI (1), 12.
Marzell, H., XVIII (2) D.
Mâshâllâh, VIII (2).
Maslama ibn Aḥmad al-Majrîṭî, X (2).
Mason, F., 27.
Maspero, H., 10.
Mathieson, J., 30.
McCrindle, J. W., II (2).
McFee, W., XVI (2) C.
McHargue, J. S., XIX (2) B.
McKeon, R., XIII (2).
Means, P. A., 44.
Meder, A., XIX (1) A.
Meeker, G. H., XIX (1) B.
Melanchthon, P., XVI (1) E.
Menahem b. Saruq, X (2).
Merriam, C. H., XIX (2) C.
Mess, H. A., 43.
Métraux, A., 40.
Metz, A., 18.
Metzler, J., XVII (2) C.
Meyer, A., 27.
Meyer, J. J., 9.
Meyer-Steineg, T., II (2).
Meyerhof, M., II (2), 1.
Middleton, W. S., XVIII (2) D.
Mikami, Y., 10.
Mill, A. J., 6.
Miller, W., 4, 50.
Moll, F., 29.
Montalenti, G., 27.
Moodie, R. L., 39.
Mookerji, R. K. B., 9.
Moore, H. H., 51.
Morden, W. J., 8.
More, Sir T., XVI (1) E.
Moreno, A. R., 31.
Moreux, T., 23.
Morgagni, G. B., XVIII (1) D.
Morgan, A. de, 13.
Mori, A., 31.
Morison, S., XV (2).
Morris, F. K., 10.
Morrison, H., 12.
Morrow, G. R., XVIII (2) E.
Moulton, F. R., 23.
Müller, M., XVIII (2) C.
Müller, R., 5.
Müller, R. F. G., 9.

Muggenthaler, H., 6.
Muthu, D. C., 9.

N

N. Y. Academy of Medicine, 50.
Nachod, O., 11.
Nägelli, C., XIX (2) C.
Nahawendi, B., IX (1).
Nakaseko, R., 25.
Netolitzky, F., 1.
Neuburger, M., 50.
Neugebauer, O., XVIII (2) B.
Neumann, F., XIX (1) B.
Newbold, W. R., XIII (2).
Newton, I., XVII (2) A.
Nicolsky, N., 12.
Nierdermayer, O. v., 8.
Norton, T., XV (2).
Nuyens, B. W. T., 34.

O

Ocagne, M. d', 20.
O'Conner, F. R., XIX (1) C.
Odeberg, H., 12.
Ohm, T., XIII (2).
Olszewicz, B., 31.
Ortelius, A., XVI (2) C.
Ortner, N., 52.
Otlet, P., 43.
Otto of Freising, XII (1).

P

Packard, F. R., XVII (1) D.
Palmer, H. R., V. B. C.
Palyi, M., XVIII (2) E.
Paris, M., XIII (2).
Partsch, J., 31.
Patch, H. R., 6.
Paton, L. A., XIII (2).
Pendrill, C., 6.
Pfeiffer, P., XX B.
Phares, S. de, XV (2).
Phillipson, C., V B. C.
Picard, E., XVII (2) A.
Pinet, M., XV (1).
Plimpton, G. A., 20.
Polo, M., XIII (2).
Pompeckj, J. F., XIX (1) C.
Powys, L. XVII (1) C.
Prestage, E., 6.
Pullè, G., XIII (1).

Q

al-Qâsim ibn Ibrâhîm al-Hasani, IX (1).
al-Qirqisânî, X (1).
Quill, L. L., 25.

R

Raby, F. J. E., 6.
Radojcic, N., XIX (1) C.
Raeder, H., 16.
Rainoff, T. J., 42.
Ranade, R. D., 9.
Raychaudhuri, H., 9.
Réaumur, R. A. F. de, XVIII (1) C.
Rey, A., 2.
Ribera y Tarragó, J., 6.
Ricard, R., XVI (1) C.
Ricketson, O., 40.
Riddle, D. W., I (1).
Robertson, W. E. A., XVIII (1) C.
Robinson, H. S., XVI (2) D.
Robinson, V., XVIII (2) D, XIX (1) D, XIX (2) D.
Rössle, R., XIX (1) D.
Rolleston, Sir H., XVII (1) D.
Rolleston, H. D., 51.
Roman Britain, 5.
Roselli, F., XVI (1) C.
Rosenfeld, L., 24.

Rougier, L., 43.
Ruska, J., 14.
Russell, B., 19.

S

Saadia b. Joseph, X (1).
Sabatier, P., XIII (1).
Saeki, P. Y., VIII (2).
Sahl b. Mazliaḥ, X (2).
Sammarco, A., XIX (1) C.
Sampey, J. R., XIX (2) B.
Samuel ha-Levi, XI (1).
Sartiaux, F., 8.
Sarton, G., 6, 16.
Sarup, L., 9.
Schevensteen, A. v., XV (2).
Schlauch, M., 6.
Schmidt, W., 40.
Schoepperle, G., 6.
Scholem, G., 14.
Schreiner, O., 25.
Schulten, A., 1.
Schuster, J., 57.
Schwartz, E., IX B. C.
Scott, E., 31.
Scott, F. M., XVII (2) C.
Secretum secretorum, IX (1).
Sei Shônagon, X (2).
Sékaly, A., 14.
Sengupta, P. C., V (2).
Shelvocke, G., XVIII (1) C.
Shenton, W. F., XVI (2) A.
Shepard, W. P., 6.
Sigerist, H. E., XVII (1) D, 50.
Silva Carvalho, A. da, XIX (1) D.
Sindik, I., XVII (2) C.
Singer, C., VI (1), 16, 50.
Slomann, H. C., 2.
Smith, D. E., XIII (2).
Smith, E. F., XIX (1) B.
Smith, G. O., XIX (2) C.
Smith, S., 3.
Snow, A. J., XVII (2) B.
Social science abstracts, 43.
Sokolovsky, G. N., XVII (1) C.
Somadeva, XI (2).
Speleers, L., 8.
Srbik, R., XVI (2) C.
Staden, H., XVI (2) C.
Stapleton, H. E., 14.
Steffen, J., XVI (1) C.
Stenger, E., XVIII (2) B.
Stephenson, J., XIV (1).
Sternberg, M., XIX (1) D.
Stevens, C. G., 1.
Stevens, H. N., XVI (1) C.
Stieglitz, J., 25.
Stolz, O., 31.
Strauss, H. A., 23.
Streicher, F., XV (2).
Strömgren, H., XVII (2) D.
Stromer v. Reichenbach, E., 16.
Struik, D. J., XIX (1) A.
Struik, R., XIX (1) A.
Studnička, F. K., XIX (1) C.
Style, J. M., XIX (1) E.
Su-Hein Ting, 25.
Suidas, X (2).
Sullivan, J. W. N., 18.

T

Täschner, F., 14.
Taylor, E. G. R., XVI (1) C, 31.
Teeple, J. E., 40.
Teixeira de, M. E., XVII (1) D.
Temkin, O., V B. C, XVII (2) D.
Tesdorpf, P., 50.
Thompson, D. W., 2.
Thompson, J. W., 6.
Thoms, H., XVIII (2) D.
Thomson, J. A., 18.
Thomson, Sir J. J., 24.
Thomson, Sir St. C., XVIII (2) D.
Tiberghien, A., XIX (1) E, 31.

Tischner, R., XVIII (2) D.
Toll, H., I (1).
Travers, M. W., XIX (2) B.
Tresk, O., XVI (1) C.
Tristram, E. W., 6.

U

Uvarov, B. P., 29.

V

Valla, L., XV (1).
Van Eerde, J. C., 8.
Van Roon, J., XIX (1) C.
Vasconcellos, E. de, XV (2).
Vasiliev, A. A., 7.
Vetter, Q., XIII (1), XIV (1), 20.
Viner, J., XVIII (2) E.
Vinogradoff, P., 43.
Vocht, H. de, XV (1) E.
Vonderheyden, M., IX (1).

W

Walden, P., XIX (1) B.
Waldschmidt, E., 8.
Walsh, J. J., XVI (2) D.
Ward, H., XIX (2) C.
Warmington, E. H., 9.
Warren, W. H., XIX (1) B.
Waters, E. G. R., XIII (1).
Wegener, A., 32.
Wehrli, G. A., 50.
Wenkebach, E., II (2).
Wheeler, W. M., 29.
Wickersheimer, E., XV (2).
Wieleitner, H., XVII (1) A.
Wigmore, J. H., 43.
Wilamowitz-Moellendorff, U. v., IX B. C, XIX (2) E.
Williams, F. E., 40.
Witte, J., V B. C.
Wlaschky, M., 6.
Wood, S., XVII (2) C.
Woodward, B. B., VI (1).
Woolf, A. E. M., XVIII (2) D.
Wright, J., XIV (1), 40.

Y

Ya'qûb ibn Ṭâriq, VIII (2).
al-Ya'qûbî, IX (2).

Z

Zachrisson, R. E., 6.
Zeiss, H., XIX (2) D.
Zeitschrift d. Gesell. f. Erdkunde z. Berlin, 31.
Zenker, E. V., 10.
Zimmermann, H., XVIII (2) C.
Zwick, K. G., 50.

IMPRIMERIE SAINTE-CATHERINE, BRUGES (BELGIQUE).